

**KNOWLEDGE, ATTITUDES AND BEHAVIOUR TOWARDS HUMAN PAPILLOMA
VIRUS (HPV) AND HPV VACCINE AMONG PARENTS WITH ADOLESCENT GIRLS 9
TO 13 YEARS IN SEFHARE, BOTSWANA**

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submitted in accordance with the requirements

for the degree of

MASTER OF PUBLIC HEALTH

at the

UNIVERSITY OF SOUTH AFRICA

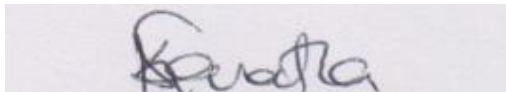
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November 2017

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DECLARATION

I declare that **KNOWLEDGE, ATTITUDES AND BEHAVIOUR TOWARDS HUMAN PAPILLOMA VIRUS (HPV) AND HPV VACCINE AMONG PARENTS WITH ADOLESCENT GIRLS 9 TO 13 YEARS IN SEFHARE, BOTSWANA** is my own work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references and that this work has not been submitted before for any other degree at any other institution.



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SIGNATURE

Kgola Tebogo Senatla

3 October 2017

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DATE

KNOWLEDGE, ATTITUDES AND BEHAVIOUR TOWARDS HUMAN PAPILLOMA VIRUS (HPV) AND HPV VACCINE AMONG PARENTS WITH ADOLESCENT GIRLS 9 TO 13 YEARS IN SEFHARE, BOTSWANA

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ABSTRACT

Human papillomavirus (HPV) is the most common cause of sexually transmitted diseases. It is the causative agent of cervical cancer, anal, and penile cancers.

The purpose of the study was to determine the knowledge, attitude and behaviour of parents towards HPV and HPV vaccine in preventing cervical cancer in girls aged 9 to 13 years and HPV vaccine uptake.

The study was conducted in Sefhare village, in the Central District of Botswana. The researcher selected a quantitative, descriptive cross-sectional research design and data was collected using a questionnaire in face-to-face interviews. The study population consisted of parents of adolescent girls of ages 9-13 years living in four wards of Sefhare village. Data was analysed using SPSS version 19.

The study found a high level (71.8%) of knowledge about HPV infection, cervical cancer and HPV vaccine and a positive attitude (81.5%) and behaviour (62%) towards the HPV vaccine.

Key terms

Adolescent; attitude; behaviour; cervical cancer; Human papilloma virus (HPV); HPV vaccine; knowledge; parents; uptake.

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Dedication

This study is dedicated to my family, and my late parents and sisters

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LIST OF ABBREVIATIONS

ANOVA	Analysis of variance
CI	Confidence Interval
Df	Degree of freedom
DHMT	District Health Management Team
HBM	Health Belief Model
HIV	Human Immunodeficiency Virus
HPV	Human Papillomavirus
ICO	Information centre on HPV and cancer
MoH	Ministry of Health
PHASA	Public Health Association of South Africa
P-value	Probability value
Sig	Significance
SPSS	Statistical Package for Social Sciences
STD	Sexually Transmitted Disease
STI	Sexually Transmitted Infection
VIA	Visual Inspection using Acetic Acid
WHO	World Health Organization

CHAPTER 1

ORIENTATION TO THE STUDY

1.1 INTRODUCTION

Human papillomavirus (HPV) is the most common cause of sexually-transmitted diseases (STDs) in men and women. It is also the established causative agent of cervical cancer, anal and penile cancers as well as genital warts in both men and women. Protection against strains of HPV that lead to cervical cancer and cause genital warts can be achieved through immunisation with the HPV vaccine. To maximise effectiveness, the vaccine needs to be given to girls before they are sexually active. Several HPV vaccines have been developed, including Gardasil and Cervarix.

Cervical cancer is a serious health problem that claims the lives of many women and remains a grave concern in Botswana and around the world (Ramogola-Masire 2014:81). In sub-Saharan Africa, cervical cancer ranks as one of the two top causes of death in women (Ramogola-Masire 2014:81). It is the second most common cancer among women, and the most frequent among women aged between 15 and 44 years. Cervical cancer can affect any woman. Many countries have adopted the prevention strategy of the HPV vaccine to vaccinate adolescent girls between 9 and 13 years old.

There is a worldwide high incidence rate of HPV infections and cervical cancer. Globally, an estimated 500,000 new cases and 274,000 deaths occur annually (Turiho, Okello, Muhwezi, Harvey, Byakika-Kibwika, Meya & Katahoire 2014:45). Over 80% of the deaths occur in developing countries, where cervical cancer is the leading cause of cancer deaths among adult women (Turiho et al 2014:45; Mouallif, Bowyer, Festali, Albert, Filali-Zegzouti, Guenin, Delvenne, Waller & Ennaji 2014:409). In France, an estimated 2,800 new cases were diagnosed in 2011, leading to 1,000 deaths (Haesebaert, Lutringer-Magnin, Kalecinski, Barone, Jacquard, Regnier, Leocmach, Vanhems, Chauvin & Lasset 2012:1034).

In a study in North India, it was found that persistent HPV infection led to invasive cervical cancer in 80% of sexually active women (Hussain, Nasare, Kumari, Sharma,

Khan, Das & Bharadwaj 2014:1). In Morocco, cervical cancer is a major public problem and is ranked second to breast cancer in women in terms of incidence and mortality, with approximately 1,979 new cases and 1,152 deaths each year, and an incidence and mortality rate of 14.1 and 8.4 per 100,000 (Mouallif et al 2014:409). In South Africa, more than 7,700 women are diagnosed with cervical cancer every year, of who more than half will ultimately die of the disease (Richter 2015:1). The fight against cervical cancer includes early detection and screening. The screening can be done using a Pap smear or Visual Inspection using Acetic Acid [VIA] (Raditsebe 2017:2). Women are screened for cervical cancer and treated immediately if there is evidence of cancer. Prevention of cervical cancer is achieved through HPV vaccine.

Several studies have been conducted on parents' attitudes and knowledge of HPV and the HPV vaccine. In 2015, Milimo, Daka, Sikuyuba, Nyirenda and Ngoma (2015:084-091) conducted a study in the Chipata, Monze, Lusaka and Namwala districts in Zambia among parents/guardians of school-going girls aged 9 to 13. Of the respondents, 64% reported that they had heard about HPV; 68.5% had heard about the HPV vaccine; 74% knew that girls aged 9 to 13 years should be given the HPV vaccine and that it prevented girls from contracting HPV infection. Of the respondents, 66% knew that HPV could lead to cervical cancer; 84% agreed that the HPV vaccine was helpful in preventing cervical cancer and should be given to girls aged 9 to 13 years, and 83% would allow their girls to be vaccinated. Milimo et al (2015) found that the respondents had knowledge about HPV and the HPV vaccine and therefore a positive attitude towards the vaccine.

In Morocco, Mouallif et al (2014:409-416) examined awareness and vaccine acceptability among parents. The aim of the study was to assess awareness of HPV and the vaccine, and identify factors associated with acceptability of the vaccine among parents. The study found low awareness of HPV and the vaccine and low acceptability of the HPV vaccine. Acceptability of the vaccine was influenced by higher education, previous awareness, the belief that the vaccine was recommended by the Ministry of Health or a doctor, and the cost of the vaccine. The study found a relationship between awareness of the HPV vaccine and acceptability, which means that parents need information about HPV and the vaccine in order to accept the vaccine. The more parents accept the vaccine, the more they will take their daughters for vaccination.

In 2012, Thomas, Strickland, DiClemente, Higgins and Haber (2012:358-367) conducted a study among rural African American parents in three counties in the United States of America (USA). The study examined the parents' knowledge and decisions about HPV vaccination, using the Health Belief Model (HBM) as the theoretical foundation. The HBM identifies correlates of health-related behaviour and posits four factors to account for the behaviour, namely perceived vulnerability; perceived severity; perceived benefits, and perceived barriers. The parents who tended to vaccinate their daughters scored lower on perceived vulnerability and higher on perceived barriers. The study found that the parents with a high educational level tended to vaccinate their daughters. This indicated a relationship between the parents' level of education and their decision to vaccinate their daughters.

In the USA, Griffioen, Glynn, Mullins, Zimet, Rosenthal, Fortenberry and Kahn (2012:568) explored the factors influencing mothers' decisions to vaccinate 11-12 year-old daughters against HPV. The study found that the mothers' beliefs about and experiences of vaccination and HPV-related diseases; interactions with clinicians, friends and family members, and exposure to media reports/marketing about the HPV vaccine influenced their decisions (Griffioen et al 2012:561).

In Japan, Hanley, Yoshiaka, Yoshiya, Konno, Hayashi, Kishi and Sakuragi (2012:916) examined Japanese mothers' acceptance of and attitudes towards HPV vaccination of their adolescent daughters. The study wished to identify socio-demographic and attitudinal predictors associated with HPV vaccination acceptance. The study found that the majority of the mothers would vaccinate their daughters if the vaccine was free; the acceptance rate was higher among mothers who had heard about the HPV vaccine or when a doctor or local health board had recommended it. The study also found that the side effects of the vaccine were a barrier to vaccination. These findings confirm that knowledge is very important for parents to make sound decisions.

Parents who had knowledge about HPV and the HPV vaccine had a positive attitude and took their daughters for HPV vaccination which is a positive behaviour. In addition, parents with a high educational level took their daughters for immunisation.

1.2 BACKGROUND TO THE STUDY

Botswana is a middle-income country situated in Sub-Saharan Africa. The country has a high incidence of HPV infections and cervical cancer. Botswana has a population of 773418 women aged 15 and older who are at risk of developing cervical cancer (ICO Information Centre on HPV and cervical cancer [ICO fact sheet] 2017). An estimated 250 women are diagnosed with cervical cancer annually and 111 of them die (Information Fact CO Information Centre on HPV and cervical cancer [ICO fact sheet] 2014). Moreover, cervical HPV infection is a burden in Botswana, accounting for 53% of women tested (95% Confidence Interval [CI]) (ICO 2014).

The high prevalence of HPV contributes to increased morbidity and mortality of cervical cancer. The HPV vaccine was licensed in Botswana in 2009, and is now given free to adolescent girls aged 9 to 13 years as a preventive strategy against HPV. The Ministry of Health introduced the Gardasil vaccine and vaccination programme (see chapter 2). The programme targets girls at primary school and out-of-school aged 9 to 13 years. The roll-out started in March 2013 and girls receive three doses of the vaccine.

A study to assess the acceptability of the HPV vaccine among parents and adults attending a public hospital, before the inclusion of HPV vaccine in the Botswana national cancer prevention programme, concluded that the HPV vaccine was highly accepted if it became widely available to the daughters of healthcare-seeking parents in Gaborone (Ramogola-Masire 2014:82-83).

The magnitude of cervical cancer in Botswana raised the following questions in the researcher's mind: Do people know about HPV, and that it causes cervical cancer? Do they know that cervical cancer is preventable using the HPV vaccine according to the programme? Girls are at risk of contracting HPV which can lead to cervical cancer and it is the responsibility of parents to make sure that their daughters are vaccinated against HPV. Parental consent is required for vaccination of adolescent girls. Parents are key decision makers therefore they should have the necessary information in order to make informed decisions. Parents' decision to vaccinate their daughters plays a crucial role in the successful implementation of the prevention programme. The public health benefit of the prophylactic vaccination can be achieved if parents have knowledge and positive attitudes towards the HPV vaccine. This motivated the researcher to conduct a study on

the knowledge, attitude and behaviour towards HPV and HPV vaccine among parents with adolescent girls aged 9 to 13 in Sefhare village, in Tswapong area in the Central District of Botswana. Sefhare falls under the Mahalapye District Health Management Team and the Mahalapye East catchment area. There is one primary hospital and five (5) mother clinics, of which four (4) have a maternity wing, and seven (7) health posts. In 2011, Sefhare had a population of 4602, consisting of 2050 males and 2552 females (Population and Housing Census 2011:100).

1.3 STATEMENT OF THE PROBLEM

A research problem is “a troubling condition which can be solved by generating evidence through research” (Polit & Beck 2012:73). A problem statement “articulates the problem and describes the need for a study through the development of an argument” (Polit & Beck 2012:73). There are increasing cases of HPV infections and cervical cancer in Botswana. Statistics indicate that 250 women are diagnosed with cervical cancer annually (ICO 2014:12, Raditsebe 2017:2). Cervical cancer claims the lives of women, which poses a threat to future generations and increases the health bill thereby impacting negatively on the economy of the country.

The Government of Botswana makes provision for the HPV vaccine to be given to school-going girls aged 9-13 as prophylaxis to prevent cervical cancer. Parents’ consent is required for vaccination, however, which means that the parents should have the necessary knowledge in order to make informed decisions.

With the increasing number of HPV infections and cervical cancer in Botswana, the researcher proposed to investigate the parents’ knowledge about HPV and the HPV vaccine. Hence, the researcher conducted a study to assess the knowledge, attitudes and behaviour towards HPV vaccine.

1.4 PURPOSE AND OBJECTIVES OF THE STUDY

The purpose of the study was to determine the knowledge, attitude and behaviour of parents towards HPV and the HPV vaccine in preventing cervical cancer in girls aged 9 to 13 years in Sefhare, Botswana. The study evaluated the uptake of the HPV vaccine and implementation of prevention strategy.

In order to achieve the purpose, the objectives of the study were to:

- Determine the level of knowledge of parents of adolescent girls between the ages of 9 to 13 years regarding HPV and HPV vaccine.
- Assess the attitudes of parents with adolescent girls aged 9 to 13 years towards HPV and HPV vaccine and their willingness to take their daughters for vaccination.
- Determine parents' behaviour in uptake of HPV vaccine.
- Make recommendations based on the findings.

The study wished to answer the following questions:

- Do parents know about HPV infections and the HPV vaccine?
- What is their attitude and behaviour towards HPV and HPV vaccination?

1.5 SIGNIFICANCE OF STUDY

The findings from this study will contribute to the body of knowledge on HPV and the HPV vaccine, particularly in Botswana. Parents would be aware and knowledgeable about HPV and the HPV vaccine thereby contributing to reducing the incidence of HPV infections and cervical cancer.

The study should raise awareness of early cervical cancer screening. This would reduce the health bill for the country. The findings should help in identifying areas that need emphasis in preventing cervical cancer by addressing areas that need improvement. The findings should lead to improved effectiveness and implementation of the programme and improved immunisation coverage. Unimmunised girls who are eligible for immunisation will be identified and assisted accordingly.

1.6 RESEARCH PARADIGM

A paradigm is a worldview, a general perspective on the complexities of the world (Polit & Beck 2012:11). Polit and Beck (2012:15) add that paradigms are lenses helping to

sharpen the researcher's focus on a phenomenon. Paradigms for humans are characterised by terms in which they respond to philosophical questions; such as, what is the nature of reality (ontology) and what is the relationship between the inquirer and those being studied (epistemology) (Polit & Beck 2012:11).

The positivism paradigm, also called logical positivism, has been used for nursing research for many years. Positivism emphasises the rational and the scientific (Polit & Beck 2012:12). In positivism, an assumption is believed to be true without proof or verification. Positivists believe phenomena or occurrences are not haphazard, but have antecedent causes. This is referred to as determinism. There must be a reason or reasons why something happens. The positivist approach involves using orderly, disciplined procedures with tight controls of the research to test researchers' perceptions about the phenomena being studied and relationships among them (Polit & Beck 2012:12).

In positivism there is another paradigm called postpositivism. Postpositivists believe in reality and the desire to understand it. They view objectivity as a goal and try to be as unbiased as possible. Evidence for a study is collected according to an established plan using structured methods to collect needed information (Polit & Beck 2012:14).

Hence, this study adopted the post-positivism approach. Evidence of the study was collected using formal instrument to collect data. Furthermore, a structured questionnaire was used for data collection and the data was analysed using statistical procedures. In this study, the researcher acknowledged that for parents to make good decision about vaccinating their daughters they should have knowledge about HPV infections and the HPV vaccine. A positive attitude towards the HPV vaccine would result in the positive behaviour of having the girls vaccinated. There is a relationship between knowledge, attitude and behaviour. There is a relationship between educational level and HPV vaccine uptake.

1.7 THEORETICAL FRAMEWORK

A framework is the overall conceptual underpinnings of the study. A theory is a set of interrelated hypotheses, concepts, constructs, definitions and propositions that present a systematic review of phenomena based on facts and observations, with the purpose

of explaining and predicting the phenomena (De Vos, Strydom, Fouché & Delport 2011:37). In a study based on a theory, the framework is referred to as a theoretical framework (Polit & Beck 2012:128). A theoretical framework is based on prepositional statements resulting from an existing theory. It helps the researcher to organise the study and provide a context in which a problem is examined, and data is collected and analysed (Brink, Van der Walt & Van Rensburg 2006:24). Polit and Beck (2012:126) describe a theory as an abstract generalisation that systematically explains how phenomena are interrelated.

The researcher used the revised Health Belief Model as the theoretical framework for the study. Becker's Health Belief Model is a framework for explaining people's health-related behaviour, such as health care use and compliance with a medical regimen. The model states that health-seeking behaviour is influenced by a person's perception of a threat posed by the health problem, and the value associated with actions aimed at reducing the threat (Polit & Beck 2012:136).

The revised Health Belief Model incorporates self-efficacy. The researcher considered the revised Health Belief Model appropriate for the study to explain the parents' behaviour in relation to HPV vaccine uptake and their compliance. Compliance was evidenced by completion of three doses.

Socio-demographic factors have an influence on perceived vulnerability, severity, benefits and barriers. Regarding perceived vulnerability, if the parents had a negative attitude to or belief about the HPV vaccine, such as thinking that it could lead to promiscuity when given to young girls, they might have a negative attitude hence a negative behaviour. Regarding perceived severity, if the parents knew about HPV and that it poses a threat of causing cervical cancer, they would allow their daughters to be vaccinated to reduce the threat. If the parents believed that there were some health benefits of HPV vaccination that would positively influence their behaviour. Perceived barriers like transport or access to HPV vaccination might also have an influence on their behaviour. The health workers and media reminders would lead to positive behaviour in receiving HPV vaccination thereby reducing cervical cancer incidence. The parents were allowed to demonstrate self-efficacy by allowing them to make an independent decision to take their daughters for vaccination and to participate in the

study. The parents also made the decision to allow their daughters to be vaccinated. Figure 1.1 shows the Health Belief Model as it applied to HPV vaccination in this study.

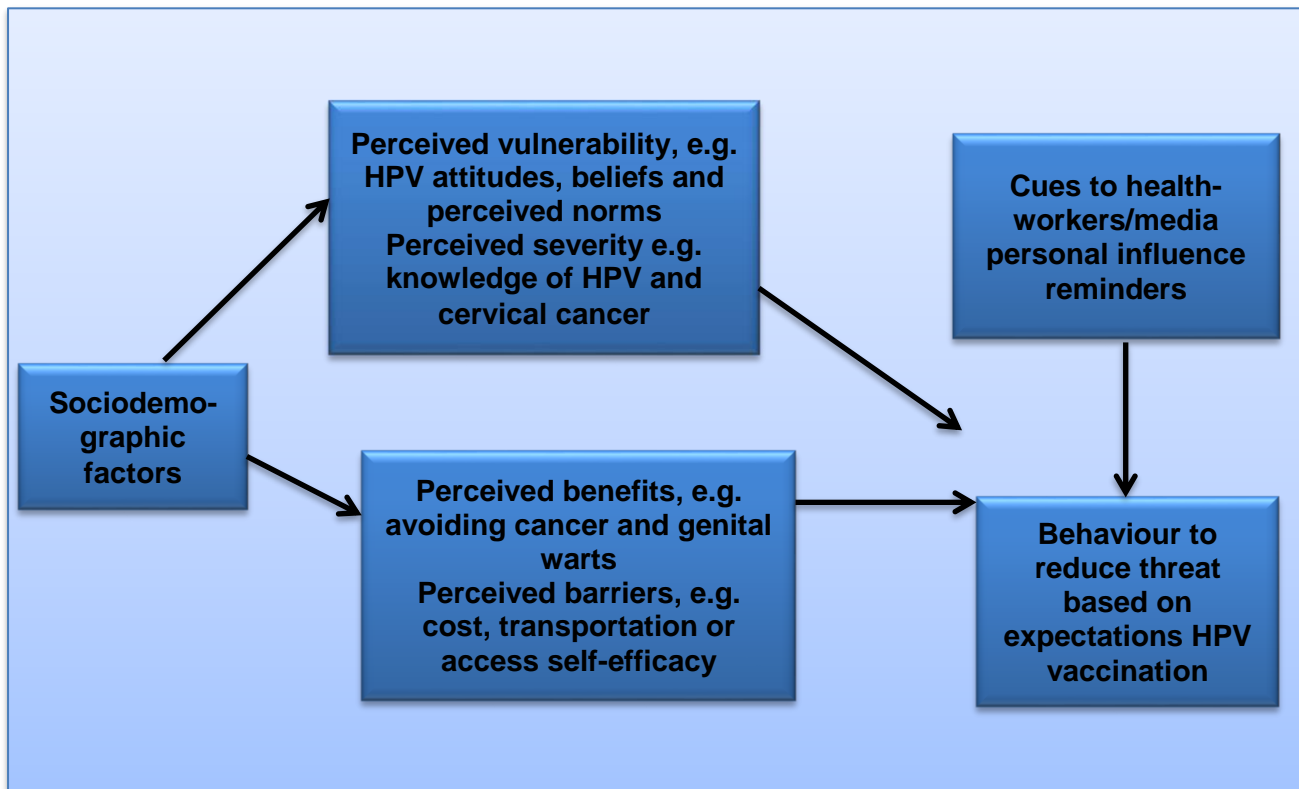


Figure 1.1 Health Belief Model applied to HPV vaccination

(Thomas et al 2012:363)

1.8 RESEARCH DESIGN AND METHODOLOGY

A research design is the overall plan for obtaining answers to research questions (Polit & Beck 2012:58). It is the architectural backbone of the study and indicates where the study will take place, and how data will be collected. The researcher used a quantitative, descriptive, cross-sectional study design. A descriptive design enables researchers to describe variables in order to answer research questions with no attempt at establishing a cause-effect relationship (Brink et al 2006:102).

The research methodology refers to the steps, procedures and strategies used to structure a study and to collect and analyse data relevant to the research questions (Polit & Beck 2012:12). The research methodology includes the population; sample and sampling; data collection and analysis; validity and reliability; pilot study or pre-test, and

ethical considerations. Chapter 3 discusses the research design and methodology in detail.

1.9 SCOPE OF THE STUDY

The study investigated the knowledge, attitudes and behaviour towards HPV and the HPV vaccine among parents with adolescent girls aged 9 to 13 years in Sefhare village. The respondents consisted of parents residing in Sefhare. The number of adolescent girls whose parents participated in the study was calculated in order to assess the HPV vaccine uptake.

1.10 ETHICAL CONSIDERATIONS

When humans are used as study respondents care must be taken in ensuring that their rights are protected (Polit & Beck 2012:748). Accordingly, the researcher obtained permission to conduct the study and observed the ethical principles of beneficence, justice, autonomy and anonymity (Polit & Beck 2012:748). Chapter 3 discusses the ethical considerations in full.

1.11 DEFINITION OF KEY TERMS

For the purposes of this study, the following terms were used as defined below:

Adolescent: The WHO (2009:6, 7) refers to young persons aged 10 to 19 years as adolescents. In this study, adolescent referred to girls between 9 and 13 years old in Sefhare in Botswana.

Attitude: Attitude is defined as “the opinions and feelings that one usually has about something especially when this is shown in one’s behaviour” (*Longman Dictionary of Contemporary English* 2011:94). In this study, attitude referred to the feelings or opinions of parents about HPV and the HPV vaccine, how they perceived HPV and whether they accepted the HPV vaccine or not.

Behaviour: Behaviour is defined as “the things that a person or animal does” (*Longman Dictionary of Contemporary English* 2011:137). In this study behaviour referred to what

parents did with regard to taking their daughters for vaccination; that is, whether they took their daughters for vaccination or not.

Cervical cancer: Cervical cancer is an “uncontrolled growth of cells on the cervix” (Botswana Ministry of Health 2014:7) The *Oxford Medical Dictionary* (2015:135) defines cervical cancer as “cancer of the neck of the uterus”.

Human papillomavirus (HPV). Human papillomavirus (HPV) is the name given to a group of more than 200 sexually transmitted viruses spread through skin-to-skin contact during sexual activity (Ministry of Health Botswana 2014:8). HPV cause cervical cancer, and the HPV vaccine is used to prevent it.

Knowledge: Knowledge is “the information, skills and understanding that one has gained through learning or experience” (*Longman Dictionary of Contemporary English* 2011:969). In this study, knowledge referred to what the parents understood or information they had regarding cervical cancer, HPV and the HPV vaccine.

Parent: Someone who takes care of and raises a child or relative or guardian who plays the role of the parent. In this study, parent referred to anyone above 18 years who lived with the child and took the responsibility of making decisions regarding HPV vaccine uptake.

Uptake: Uptake means “the number of people who use a service or accept something that is offered” (*Longman Dictionary of Contemporary English* 2011:1935). In this study, uptake referred to the number of parents who accepted the HPV vaccine and daughters who received the HPV vaccine.

Vaccine: A vaccine is “a substance which contains a weak form of the bacteria or virus that causes a disease and is used to protect people from that disease” (*Longman Dictionary of Contemporary English* 2011:1940). In this study, the HPV vaccine referred to the substance used to protect adolescents from cervical cancer.

1.12 STRUCTURE OF THE DISSERTATION

The dissertation consists of five chapters:

Chapter 1	Orientation to the study
Chapter 2	Literature review
Chapter 3	Research design and methods
Chapter 4	Data analysis, interpretation and findings
Chapter 5	Conclusion and recommendations

1.13 CONCLUSION

HPV infections and cervical cancer are of grave concern and a heavy burden in Botswana and worldwide. It is evident that awareness and knowledge play a vital role in parents' attitude and willingness to vaccinate their daughters against HPV. This chapter discussed the problem, purpose, objectives and significance of the study. The research paradigm, theoretical framework, research design and methodology and ethical considerations were briefly described and key terms defined.

Chapter 2 discusses the literature review conducted for the study.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

This chapter discusses the literature review conducted for the study. A literature review helps researchers to easily understand the meaning and nature of the identified research problem (De Vos et al 2011:134). The purpose of the review is to convey what is currently known on the topic of interest. In addition, it assists researchers to comprehend and extend their knowledge of the phenomenon under study (Polit & Beck 2012:105). The literature review covered HPV and HPV vaccines; the incidence and prevalence of HPV and cervical cancer; transmission of HPV, and knowledge, attitudes and behaviour towards HPV and the HPV vaccine.

2.2 HUMAN PAPILLOMAVIRUS (HPV)

Human papillomavirus (HPV) is the name given to a group of more than 200 sexually-transmitted viruses spread through skin-to-skin contact during sexual activity (Ministry of Health Botswana 2014:8). HPV is the most common cause of sexually-transmitted diseases in both men and women. It is the established causative agent of cervical cancer, anal and penile cancers as well as genital warts in both men and women. HPVs are categorised as cutaneous or mucous types. Cutaneous types target the skin of the hands and feet. Mucous types infect the mouth, throat, respiratory tract and ano-genital epithelium. Based on their association with cervical cancer and pre-cancer lesions, HPVs can be grouped into low and high risk. High risk HPVs include types 16 and 18 which are mostly associated with cervical cancer. Estimates show that 50 % of sexually active men and women will have at least one HPV infection at some point in their lives (Botswana Ministry of Health 2014b). HPV infection can be cleared away naturally, but may persist and progress to cervical cancer if not treated. HPV has no cure.

There is a worldwide high incidence rate of HPV infections and cervical cancer. Globally, an estimated 500,000 new cases and 274,000 deaths occur annually (Turiho et al 2014:45).

Statistics indicate increased incidence and deaths from cervical cancer. In the *Sustainable Development Goals, 2030-2035*, the World Health Organization (WHO) emphasises the necessity of addressing cervical cancer (Richter 2015:1).

The fight against cervical cancer includes early detection. The routine prevention of cervical cancer is through a Pap smear and visual inspection using acetic acid (VIA). In Botswana this is commonly known as the 'see and treat' programme, because women come to clinic, get screened and treated if there is evidence of pre-cancer.

In response to the increased mortality rate, many countries adopted the HPV vaccine as a preventive strategy against HPV infections, cervical cancer and related diseases, to vaccinate girls before they are sexually active. The age at vaccination differs from country to country. In Botswana, the HPV vaccine is administered to adolescent girls aged 9 to 13 years, who are in Standards 4, 5 and 6, respectively. Several studies have been conducted to assess parents' awareness and knowledge of and attitudes towards HPV and the HPV vaccine

2.3 HPV VACCINE AS A PREVENTIVE STRATEGY

In 2006, the United States of America was the country to approve the quadrivalent vaccine for females, extending this approval to use in males in 2009 (Fu, Bonhomme, Cooper, Joseph & Zimet 2014:1901). By 2014 more than 57 countries had included the HPV vaccine in their national health programmes (Herrero, Gonzalez & Markowitz 2015:e206). Cervarix (bivalent) and Gardasil (quadrivalent) vaccines are used for preventing HPV infections. Both the bivalent and quadrivalent vaccines induce a strong immune response against HPV types as well as partial cross-protection against phylogenetically related non-vaccine HPV types. The vaccines are administered in three doses. The first dose is given at initial contact with the adolescent. The second dose is given two months after the initial dose and the third dose is given four months after the second dose.

Clinical trials indicated that three vaccine doses provide 90% to 100% protection against cervical infection and pre-cancer related to HPV 16 and 18 (Herrero et al 2015e:206).

To be fully protected, one must get all three doses. To maximise effectiveness, the vaccine is given to adolescent girls before they are sexually active.

2.3.1 Gardasil

Gardasil vaccine contains 6, 11, 16 and 18 antigens. The quadrivalent vaccine protects against cancer of the cervix, vagina, vulva and anus, and genital warts. It induces a strong immune response against HPV types. The quadrivalent vaccine is produced in yeast (*Saccharomyces cerevisiae*) and has an aluminium hydro phosphatesulphate adjuvant (Herrero, Gonzalez & Markowitz 2015:e207). Gardasil is a recombinant vaccine made of virus-like particles (VLPs) (Botswana Ministry of Health 2014a:11). Gardasil is indicated for girls and women aged 9 to 26 years.

2.3.2 Cervarix

Cervarix contains HPV 16 and 18 antigens. The bivalent vaccine is produced in Trichoplusiani insect cell lines infected with an L1 baculovirus vector and has a special adjuvant called ASO4, consisting of monophosphoryl lipid A and aluminium hydroxide (Herrero et al 2015:e207).

Protection against strains of HPV that lead to cervical cancer and cause genital warts can be achieved through immunisation with the HPV vaccine. HPV infections can also be prevented by consistent use of condoms. HPV vaccine protects one from contracting certain types of HPV and HPV-related diseases. Clinical trials found the vaccines safe, well tolerated and highly effective in preventing HPV 16 and 18 infections and related precancerous lesions.

2.4 BACKGROUND TO THE HPV VACCINE

The HPV vaccine is used as a preventive strategy against cervical cancer in adolescent girls. It has been used in Canada, the USA and Australia since 2006. Clinical trials conducted to evaluate the efficacy of the vaccines found them to be safe and tolerated. Vaccines are most successful and cost-effective public health interventions available to avert vaccine-preventable diseases and deaths (Abdullahi, Kagina, Cassidy, Adebayo & Hussey 2016:3950).

2.5 INCIDENCE AND PREVALENCE OF HPV INFECTION AND CERVICAL CANCER

The incidence and prevalence of HPV infections and cervical cancer are of grave concern. Globally, about 500,000 new cases and 274,000 deaths occur annually (Turiho et al 2014:45). More than 80% of the deaths occur in developing countries, where cervical cancer is the leading cause of cancer deaths among adult women (Turiho et al 2014:45). Approximately 530,232 new cases are diagnosed annually and over 275,000 women die every year, and 85% of these are in developing countries (Mouallif et al 2014:409). In France, an estimated 2,800 new cases were diagnosed in 2011, leading to 1,000 deaths (Haesebaert et al 2012:2). In North India, Hussain et al (2014:1) found that in 80% of sexually active women persistent HPV infection led to invasive cervical cancer. In Morocco, cervical cancer is a major public problem and is ranked second to breast cancer in women in terms of incidence and mortality with approximately 1,979 new cases and 1,152 deaths each year, and incidence and mortality rates of 14.1 and 8.4 per 100,000 (Mouallif et al 2014:409).

In South Africa, more than 7,700 women are diagnosed with cervical cancer every year, of who more than half ultimately die of the disease (Richter 2015:1). In Zambia, an estimated 2,330 women are diagnosed with cervical cancer and 1,380 die from the disease every year (ICO [fact sheet] 2016). Approximately 2,270 women are diagnosed with cervical cancer and 1451 die from the disease in Zimbabwe every year (ICO [fact sheet] 2016). In Botswana, 250 women are diagnosed with cervical cancer annually and 111 deaths reported. HPV infections are reported at 53% (95% confidence interval) (ICO 2014).

2.6 HPV AND CERVICAL CANCER

Persistent infection with oncogenic HPV may lead to the development of cervical cancer. HPV-16 and HPV-18 are the most prevalent in cervical cancer, accounting for approximately 70% of cases worldwide (Jaisamrarn, Castellague, Garland, Naude & Palmroth 2013:e798260). Most HPV infections go away on their own within one to two years and do not cause cancer (Botswana Ministry of Health 2014:9). Persistent HPV infection causes cervical changes which may lead to pre-cancer.

Cervical pre-cancer is not actually cancer, but may develop into cancer with time. Infection with HPV may take place during the teenage years and become cervical cancer in the 30s or 40s. For this reason, it is necessary to prevent HPV infection at an early age before sexual debut.

In HIV-positive women it takes even less time for the virus to cause cervical cancer (Raditsebe 2017:2). HPV does not produce any symptoms until at advanced stages when it has caused cervical cancer (Raditsebe 2017:2).

2.7 HPV/CERVICAL CANCER TRANSMISSION AND PREVENTION

HPV is transmitted sexually through skin contact. Men carry the virus and transmit it to women during the sexual act. HPV and cervical cancer can be prevented through abstinence, consistent use of condoms, and the HPV vaccine. Areas that are not covered by a condom are not protected. Routine prevention of cervical cancer is achieved by cervical screening and Pap smears which are done every three years. Visual inspection using acetic acid (VIA) and treatment with nitrous oxide for pre-cancer is also used. Pap smears and VIA check if the virus has caused any abnormal changes in the cervix associated with cervical cancer (Raditsebe 2017:2). Other ways to prevent cervical cancer include lifestyle and behavioural changes, including reducing sexual partners, no smoking and delaying age of sexual debut.

2.8 PARENTS' KNOWLEDGE, ATTITUDES AND BEHAVIOUR

In 2012, Haesebaert et al (2012:1-10) investigated French women's knowledge and attitudes towards cervical cancer prevention and HPV vaccination acceptability. The study used a quantitative-qualitative, cross-sectional design and a self-administered questionnaire. Semi-structured interviews were used to collect data. One of the objectives was to assess French mothers' knowledge of cervical cancer, Pap smears and HPV vaccination and their acceptance of HPV vaccination for their 14 to 18 year-old daughters (Haesebaert et al 2012:2). Of the respondents, 61% knew about Pap smears; 16.9% knew the causes of cervical cancer, and 76.2% were aware of the HPV vaccine. Of the respondents, 54.7% had heard about the vaccine from television and 16.0% had heard from their doctors. Regarding acceptability of the vaccine, 2% were

opposed, 40.2% were undecided, and 58.8% were in favour of the vaccine. The study found that most of the mothers supported HPV vaccination, which was a positive attitude. Haesebaert et al (2012:2) found a positive relationship between knowledge and attitude, and that attitude influences behaviour. The mothers' awareness and knowledge of the vaccine made them willing to vaccinate their daughters.

Hanley, Yoshioka, Ito, Konno et al (2012:912-916) conducted a study on the acceptance of and attitudes towards HPV vaccination in Japanese mothers of adolescent girls aged 11 to 14. This was a school-based survey and self-administered questionnaires were used. The aim of the study was to examine the mothers' attitudes to HPV and the HPV vaccine; determine acceptance of and preferences for HPV vaccine, and identify socio-demographic and attitudinal predictors associated with HPV vaccination acceptance (Hanley et al 2012:913). Of the mothers, 52.0% had heard about the HPV vaccine and 92.6% would vaccinate their daughters if the vaccine was free. The acceptance rate of the vaccine was higher in the mothers who had heard about it. Recommendation from a doctor and local health board were positively associated with high HPV vaccine acceptance.

Regarding the efficacy of the vaccine, 98.2% of the mothers believed that it would offer high protection and 96.6% believed it would offer moderate protection. The side effects of the vaccine were reported as an obstacle to vaccination. These findings indicate that parents' awareness and knowledge results in the positive behaviour of vaccinating their daughters. Knowledge is very important for parents to make sound decisions.

In Ontario, Canada, Okoronkwo, Sieswerda, Cooper, Binette and Todd (2012:117-126) examined the role of knowledge and attitudes on parents' consent to HPV vaccination of their daughters. Of the 188 respondents, 126 gave consent for their daughters to be vaccinated, while 62 declined. Those who declined had negative attitudes towards the HPV vaccine. The results indicate the effect of knowledge on the decision to give consent was confounded by strong negative attitudes (Okoronko et al 2012:126).

Ayissi, Wamai, Oduwo, Perlman, Welty, Welty, Manga & Ogembo (2012:1127-1135) investigated awareness, acceptability and uptake of HPV vaccine among Cameroonian school-attending females. This was cross-sectional study and questionnaire survey was used to collect data. The purpose of the study was to assess awareness, knowledge

and beliefs about HPV, cervical cancer HPV vaccine and willingness to vaccinate among adolescent females in North-West Cameroon (Ayissi et al 2012:1127). Of the respondents, 83.5% knew that everyone is susceptible to HPV infection; 82.3% were aware that certain HPV genotypes cause cervical cancer; 75.9% were aware that the HPV vaccine prevents HPV infection; 75.6% knew that an abnormal Pap test may be a sign of an HPV infection, and 34.2% had been vaccinated. Furthermore, of the respondents, 45.6% of adolescents strongly recommended and 33.1% recommended that girls 9 to 13 years be vaccinated against HPV infections. These findings indicate a positive relationship between knowledge, attitude and behaviour.

In 2013, Kornfeld, Byrne, Vanderpool, Shin and Kobertz (2013:59-69) in USA conducted a study on HPV knowledge and vaccine acceptability among Hispanic fathers. A cross-sectional study was used, telephone interview was used to collect data. The purpose of the study was to examine the fathers' knowledge of HPV and the vaccine and their willingness to have their adolescent daughters vaccinated (Kornfeld et al 2013:59).

Of the respondents, 84.4% knew that multiple sex partners increased the risk of HPV infection and cervical cancer, and that it could be prevented by using condoms, and 87.3% had heard about the Pap smear test. Among those aware of HPV, 52.7% were also aware of the HPV vaccine (Gardasil). Of the respondents, only 29.2% had high knowledge about HPV and the vaccine. With regard to attitude, 93.4% of the respondents agreed or strongly agreed to the HPV vaccine, and 78.8% were willing to have their daughters vaccinated. Kornfeld et al (2013:69) found a low awareness and knowledge of the HPV vaccine. Despite low levels of awareness and knowledge, however, most of the respondents showed a positive attitude towards the HPV vaccine, as evidenced by their willingness to vaccinate their daughters.

In 2014, Hussain, Nasare, Kumari, Sharma, Khan, Das and Bharadwaj (2014:e112) conducted a survey in Delhi and NCR regions of North India on perceptions of HPV, cervical cancer and HPV vaccination. The objective of the study was to assess knowledge about cervical cancer, HPV awareness, and HPV vaccine acceptance among high school to undergraduate students and their parents' perceptions and acceptance of the HPV vaccine. Of the student respondents, 69% of the females and 31% of the males knew about cervical cancer, while 72% of the females and 28% of the males were aware that the HPV vaccine was available. Of the female respondents, 70%

were willing or agreeable to HPV vaccination. Regarding the parent respondents, 13% agreed to vaccinate their daughters. These findings also confirmed a positive association between knowledge, attitudes and behaviour or practice.

In a comparative survey, Turiho et al (2014:45-53) investigated the effects of school-based HPV vaccination on adolescent girls' knowledge and acceptability of the HPV vaccine in Ibanda, Uganda. The study used a comparative, cross-sectional mixed method. Self-administered were to collect data. This was comparison between Ibanda and Mbarara districts, where Ibanda was the vaccine district while Mbarara was the comparison district. The respondents consisted of 777 girls: 444 from Ibanda and 333 from Mbarara districts. The results revealed that the girls who were vaccinated were more knowledgeable about cervical cancer and the HPV vaccine than their unvaccinated counterparts. There was not much difference in the acceptance rate between the vaccinated and unvaccinated girls, as 92.5% of the unvaccinated girls compared to 89% of the vaccinated girls were in favour of the vaccine. Turiho et al (2014:53) found no relationship between knowledge and acceptability given the slight difference in percentage between the two groups. Here there was no association between knowledge and attitude.

Perlman et al (2014:e90912) conducted a systematic review of knowledge and awareness of HPV vaccine and acceptability to vaccinate in sub-Saharan Africa. The review covered 26 studies in 13 countries which investigated the knowledge and awareness of cervical cancer, HPV and HPV vaccine, willingness and acceptability to vaccinate. Eleven out of 15 studies showed high awareness; 9 showed low awareness, and 2 showed moderate awareness, respectively. Sixteen studies assessed knowledge of cervical cancer and revealed low levels of knowledge, with 3 reporting no knowledge and 2 reporting moderate knowledge. Twelve studies examined willingness and acceptability of HPV vaccine and all revealed high levels of acceptability of the vaccine. The review indicated that despite low levels of awareness and low knowledge, the acceptance rate and willingness to vaccinate daughters was high. Perlman et al (2014) found no relationship or association between knowledge and attitude.

In Zambia, Milimo et al (2015:85-92) conducted a descriptive cross-sectional study on knowledge and attitudes towards the HPV vaccine. Questionnaires were used for data collected. The study took place in Chipata, Monze, Lusaka and Namwala districts in

order to determine the knowledge and attitudes of parents/guardians towards the HPV vaccine in preventing cervical cancer among school-going girls aged 9-13 years (Milimo et al 2015:85-92). Of the respondents, 64% reported that they had heard about HPV; 68.5% had heard about the HPV vaccine through various means including the media (35%); 74% knew that girls aged 9 to 13 years should be given the HPV vaccine and that it prevents girls from contracting HPV infection, and 66% knew that HPV could lead to cervical cancer. Of the respondents, 84% agreed that the HPV vaccine was helpful in preventing cervical cancer and was necessary to be given to girls aged 9 to 13 years, and 83% allowed the girls to be given the HPV vaccine. Regarding educational level, 35% of the respondents had achieved a college education while 76.5% were formally employed.

There was a significant association between the respondents' knowledge scores and age, educational level and occupational status (Milimo et al 2015:92). Milimo et al's (2015:92) findings show that the respondents (parents) had knowledge about HPV and the HPV vaccine and therefore had a positive attitude towards the vaccine. This confirmed a positive relationship between knowledge and attitude. It also indicated a positive relationship between education and attitude as evidenced the respondents allowing their daughters to be vaccinated.

A systematic review of knowledge, attitudes and practices on adolescent vaccination among adolescents, parents and teachers in Africa was conducted by Abdullahi, et al (2016:3950-3960). The objectives of the study were (a) to assess the knowledge, attitudes and practices among adolescents, parents and teachers on adolescent vaccination in Africa, and (b) to associate these among the key players with vaccination coverage among adolescents in Africa (Abdullahi et al 2016:3951-3952). The review considered various adolescent vaccinations such as HPV, tetanus, toxoid, rabies, HIV and tuberculosis (TB). The review included 18 carried out in ten African countries. Of the studies, 72% (n=13) investigated the HPV vaccine, while the remaining 28% (n=5) investigated TB, tetanus, rabies, HIV and adolescent vaccines in general.

For the purpose of this study, the literature review focused on the 13 studies that investigated the HPV vaccine.

The aim of these studies was to assess the knowledge, attitude and awareness/acceptability of the HPV vaccine. In all the studies, the respondents were not aware of the HPV virus and HPV vaccine, but were aware of cervical cancer. It was observed that level of knowledge amongst parents, adolescents and teachers ranged between low, moderate and high. Knowledge was considered low when less than 50% of the respondents had sufficient knowledge on specific information of the vaccine. Of the studies, 17% showed high levels of knowledge among parents and adolescents, while 28% showed moderate levels of knowledge among teachers and adolescents. Of the adolescents, 58% showed a positive attitude towards the HPV vaccine. A negative attitude towards the HPV vaccine was obtained in 11% of the studies.

In 12 studies, the adolescents highly accepted the HPV vaccine. The parents also showed a willingness to have the adolescents vaccinated. The parents' attitudes were not reported in the review. Despite the low levels of awareness and knowledge, the studies found a positive attitude and high acceptance of the HPV vaccine. The 12 studies pointed to a positive attitude influencing good behaviour as demonstrated by the adolescents' attitude and acceptance.

In 2016, Yu, Xu, Sun, Li, Li, Wang, Zhang and Xu (2016:e0146741) conducted a cross-sectional survey in Weihai, Shandong, China. The study used a cross-sectional survey and self-administered questionnaires were used to collect data. The study examined awareness and knowledge of HPV and acceptability of HPV vaccine among teenage daughters. The respondents included both urban (38.9%) and rural (45.94%) mothers of daughters aged 9 to 17 years. Of the respondents, 19.33% were aware of HPV and had heard about HPV; 14.75% had no knowledge of HPV and the HPV vaccine. The study found that 58.69% had low knowledge while 26.56% had high knowledge. The mothers with a higher educational level had high levels of knowledge and 26.49% expressed acceptance of the HPV vaccine and willingness to vaccinate their daughters. The study found poor awareness and knowledge and low acceptability of HPV and the HPV vaccine (Yu et al 2016:e0146741).

In preparation for the introduction of HPV vaccines in Bamako Mali, De Groot, Tounkara, Rochas, Beseme, Yekta, Diallo, Tracy, Teguate and Koita (2017:e0171631) investigated the knowledge, attitudes, practices and willingness to vaccinate. The study used two standardized questionnaires in structured interviews. The respondents were

interviewed, and then an information and educational session was held. This was followed by a second questionnaire. The survey included adults aged 18 and older and adolescents aged 12 to 17 years. Of 301 respondents, 149 were females and 152 were males. The results showed that before the educational session, 8.6% (n=26) were aware of HPV. Knowledge among the adolescents was poor (5.3%). The respondents' knowledge increased significantly after the educational session. The study found a high acceptance rate of the vaccine with 98.3% of the respondents being willing to vaccinate. De Groot et al (2017) found that the education session increased the respondents' knowledge and led to acceptance of the vaccine and willingness to vaccinate. This indicated a positive relationship between knowledge and attitude. Knowledge influenced the attitude and practice/behaviour outcomes.

2.9 CONCLUSION

HPV infections and cervical cancer are a major concern. HPV vaccines provide protection against HPV infections. This chapter discussed the literature review on HPV and HPV vaccines.

Chapter 3 describes the research design and methodology.

CHAPTER 3

RESEARCH DESIGN AND METHODOLOGY

3.1 INTRODUCTION

This chapter describes the research design and methodology used, including the population, sampling and sample, data collection and analysis, trustworthiness, and ethical considerations.

3.2 RESEARCH DESIGN

A research design is “a set of logical steps taken by the researcher to answer the research question” (Brink et al 2006:92). The research design is the overall plan for obtaining answers to the research questions. (Polit & Beck 2012:58). It is the architectural backbone of the study and indicates how data will be collected and where the study will take place. In this study, the researcher selected a quantitative, descriptive and cross-sectional design.

3.2.1 Quantitative

The research design was quantitative because the researcher used structured procedures and a formal instrument to collect data that was then analysed by computer into numerical information through statistical procedures (Brink et al 2006:101). The researcher considered a quantitative approach appropriate for the study and a structured, self-designed questionnaire was used to collect data from the respondents. Quantitative research is mostly aligned with the positivist paradigm. Quantitative research is the investigation of a phenomenon that lends itself to precise measurements and justification, often involving a rigorous and controlled design (Polit & Beck 2012:739). Quantitative research uses deductive reasoning to generate predictions. It typically moves in systematic fashion from definition and selection of concepts on which to focus to the solution of the problem. The investigator or researcher progresses logically through a series of steps, according to the plan of action.

Quantitative research uses empirical evidence. Research findings are grounded on reality rather than the researcher's personal beliefs. Data gathered in quantitative studies is numeric and analysed statistically. To study a phenomenon, quantitative researchers attempt to measure it by attaching numeric values that express quantity (Polit & Beck 2012:739).

3.2.2 Descriptive

Descriptive research explores and describes phenomena in real-life situations (Polit & Beck 2012:725). A descriptive study sets out to quantify the extent of the health problem or the burden of disease (Elrich & Joubert 2014:79). This study described how much the parents knew about HPV and the HPV vaccine as well as their attitudes and behaviour towards HPV and the vaccine. Their responses were quantified.

3.2.3 Cross-sectional

In a cross-sectional study, the researcher obtains all relevant information from the respondents at a single point in time, and no future follow-up contacts are made (Polit & Beck 2012:184). Sullivan (2012:8) describes a cross-sectional study as one conducted at a single point in time. Furthermore, it is appropriate when the research question is focused on the prevalence of a disease, present practice or an opinion.

The researcher considered a cross-sectional design appropriate in this study because the research question focused on the parents' views, attitudes and practice with regard to the HPV vaccine. In a cross-sectional study, the researcher usually selects the sample without reference to exposure or disease. In addition, the sample may be drawn at random from a defined population or may be a naturally occurring sample (Elrich & Joubert 2014:81). Data was collected at one point in time from each respondent. The respondents selected had not necessarily been affected by HPV or cervical cancer.

The study described the relationship between knowledge and attitudes; that is, if parents have knowledge about HPV and HPV vaccine, it is likely to influence their attitude and hence behaviour. It also described the relationship between the parents' educational level and decision to take their daughters for vaccination. The study took place at Sefhare village in the Central District of Botswana.

3.3 RESEARCH METHODOLOGY

Research methodology refers to the techniques researchers use to structure a study and to collect and analyse information relevant to the research question (Polit & Beck 2012:12). The research methodology includes the population, sample and sampling, data collection and analysis, and validity and reliability.

3.3.1 Population and setting

A population is the entire aggregation of cases in which a researcher is interested (Polit & Beck 2012:273). De Vos et al (2011:223) describe a population as individuals in the universe who possess specific characteristics. In this study, the population consisted of female and male parents/guardians of adolescent girls aged 9-13 years in Sefhare.

The inclusion and exclusion criteria were based on the respondents' ability to participate in the study and design consideration. Consideration was also given to the subjects' ability to comprehend the study information and the legal competence to give informed consent. Another important consideration was the health condition of the respondents, for example mental impairment, which could preclude participation (Polit & Beck 2012:274). Hence, the parents/guardians who were deemed mentally impaired and those below 18 years were excluded from the study. The parents who were 18 years of age and above were included. With regard to design considerations, a homogenous population of parents who have adolescent girls aged 9 to 13 years was included in the study.

The setting is the physical location and conditions in which data collection takes place in a study (Polit & Beck 2012:743). This study took place in the respondent homes and only the respondents were present during the interview process.

The place of the study was Sefhare village. The village is situated in the Central District of Botswana, in the Tswapong area. Sefhare falls under the Mahalapye District Health Management Team and the Mahalapye East catchment area. There is one primary hospital and five (5) mother clinics, of which four (4) have a maternity wing, and seven

(7) health posts. The village has a population of 4602 people, consisting of 2050 males and 2552 females (Population and Housing Census 2011:100).

3.3.2 Sampling and sample

Sampling is the process of selecting a part of the population to represent the total population so that inferences can be made about the population (Polit & Beck 2012:275). A sample is a subset of population elements, which are the most basic units about which data are collected (Polit & Beck 2012:275). The sample was randomly selected using probability random sampling.

A sample comprises elements or a subset of the population considered for actual inclusion in the study or can be viewed as a subset of measurements drawn from a population in which researchers are interested (De Vos et al 2011:223-224). In order to do sampling, a sampling frame is needed. A sampling frame refers to a list of elements from which the sample will be chosen (Polit & Beck 2012:280). The sample frame is a list of the study population (De Vos et al 2011:224). In this study, the sample frame consisted of parents of adolescent girls in four main wards (*Kgotlas*), namely Bobirwa, Maifala, Sefhare and Seruleng, in Sefhare. Stratified systematic sampling was used, and every fifth house was selected from each ward (*kgotla*). The parents/guardians were informed about the study in the main *Kgotla* and at the hospital.

Prior to the sample selection process, the researcher informed the village and hospital authorities (the village chief and hospital matron) about the study and its objectives. The respondents were informed about the study at the main Kgotla and at Sefhare Primary Hospital during the health talks. The respondents were recruited face-to-face, in a pleasant and courteous manner. The researcher identified eligible candidates and asked their permission to join the study. The study information, objectives and where the interview would take place, were explained in detail to the respondents. No incentives, monetary or otherwise, were used to recruit the respondents.

3.3.3 Sample size

There are no simple formulas that can tell the researcher how large a sample should be in a given study (Polit & Beck 2012:284). The larger the sample, the more

representative it is of the population (Polit & Beck 2012:284). The entire population was 4,602; the researcher used a confidence level of 95%, margin of error of 10 percent and response distribution of 50%. The researcher calculated the sample size using the following formula:

$$SS = \frac{Z^2 * (p) * (1-p)}{c^2}$$

Where:

Z = Z value (A confidence interval of 95% was employed in this study, 1.96 was the Z value used to calculate the sample size)

p = (.5 used for sample size needed)

c = confidence interval (0.1 was used as the margin of error)

Correction for finite population

$$\text{new ss} = \frac{Ss}{1 + \frac{ss-1}{\text{Population}}}$$

The researcher selected a sample of 95 parents/guardians, calculated according to the formula. As a university requirement, 100 respondents were used. Twenty-five households from each *kgotla* participated in the study; every fifth household was selected.

3.3.4 Data collection

Data collection is the precise, systematic gathering of information relevant to the research purpose or objectives of the study (Polit & Beck 2012:723). Data was collected by means of face-to-face interviews, using a structured self-administered questionnaire. According to Polit and Beck (2012:723), when structured questionnaires are used, the respondents are asked to respond to similar questions, in the same order and with the same set of response options. The interviews were conducted in the respondents'

households. The researcher explained the purpose of the study, that participation was voluntary and that they could withdraw from the study at any time should they wish to do so. The respondents signed a consent form before the interview. No one was present during data collection. At the end of the interview, the researcher explained the correct answers to the respondents so that they were left knowledgeable.

3.3.4.1 *Data-collection instrument*

The researcher developed a questionnaire containing closed and open-ended questions (Polit & Beck 2012:298). The questionnaire consisted for four sections (see Annexure D):

- Section 1 - Demographic data: Respondents' age, gender, educational level and ward
- Section 2 - Knowledge of HPV: Respondents' knowledge of HPV infection, cervical cancer and the HPV vaccine
- Section 3 - Attitude: Respondents' attitudes towards HPV, cervical cancer and the HPV vaccine, including how respondents perceived the severity and susceptibility to HPV infections and cervical cancer
- Section 4 - Behaviour: Respondents' behaviour regarding HPV vaccination.

The researcher submitted the questionnaire to the supervisor for review and approval. The researcher sent the questionnaire to the UNISA Ethical Committee for Higher Degrees and the Ministry of Health and Wellness (Botswana) for review.

3.3.4.2 *Pre-test or pilot study*

A pre-test or pilot study is a trial run to determine whether the instrument is clearly worded and free from major biases and whether it solicits the desired information (Brink et al 2006:94). It provides an opportunity to try out the technique or instructions that will be used with an instrument, especially if the instrument has not been used with a specific population, as in the case of this study. The purpose is not to collect data but to identify problems that the potential respondents might have in either understanding or interpreting any questions. In this study the researcher conducted a pilot study on ten parents who did not participate in the main study.

After the pilot study the researcher altered the questionnaire based on the feedback and limitations identified. For example, if the option “no” was not appropriate, an option “not sure/no idea” was added. If a child had not received the HPV vaccine, the follow-up question of completion of the dosage did not apply and the option “not applicable” was added.

3.3.5 Data analysis

Data analysis entails categorising, ordering, manipulating and summarising the data and describing them in meaningful terms (Brink et al 2006:170).

A statistician analysed the data using the statistical package for social sciences (SPSS) version 19. Inferential statistics were used. Inferential analysis of variance (ANOVA) was used to test the relationship between knowledge, attitude and behaviour. The responses were scored on a 4-point Likert scale and coded consistently with the respondents’ responses.

ANOVA is the test that provides a global assessment of the statistical significance in more than two independent means (Sullivan 2012:152). One-way ANOVA determined whether there was a significant difference in educational level regarding attitudes and behaviour towards HPV and the HPV vaccine. The Chi-square was calculated to compare knowledge, attitudes and behaviour between males and females.

Percentages for demographic characteristics were calculated. The researcher calculated and compared the percentages of parents’ knowledge, attitudes and behaviour between the four wards. Relationships, associations and inferences were made. Chapter 4 discusses the data analysis and interpretation and results in detail.

3.4 INTERNAL AND EXTERNAL VALIDITY

Validity is the degree to which an instrument measures what it is supposed to measure (Polit & Beck 2012:336). Validity refers to the extent to which an empirical measure adequately reflects the real meaning of the concept under consideration (De Vos et al 2011:172). Internal validity concerns the validity of inferences that, given that an

empirical relationship exists, it is the independent variable that caused the outcome, not something else (Polit & Beck 2012:236). Internal validity implies that the independent variable is the one that caused the outcomes.

Knowledge was the independent variable in the study. The parents' knowledge determined whether they would have a positive attitude towards HPV and HPV vaccine and their willingness to vaccinate their daughters.

This study indicated a positive relationship and association between knowledge and attitude, and that attitude influenced behaviour. The study also found that knowledge influenced the parents' acceptance of the HPV vaccine.

External validity is the extent to which it can be inferred that relationships observed in a study hold true over variations in people, conditions and settings as well as variations in treatment and outcome (Polit & Beck 2012:250). External validity is about the generalisability of causal inferences (Polit & Beck 2012:237). This means whether the same results will be achieved by a different researcher and whether results could be generalised to the community. The findings from the study were generalised to parents of adolescent girls in Sefhare. The same results can be obtained by a different researcher.

3.5 CONFOUNDING VARIABLES

A confounding variable is a variable that is extraneous to the research question and confounds the relationship between the independent and dependent variables (Polit & Beck 2012:723). A confounding variable is not important to the research question but can affect the relationship between independent and dependent variables. In this study, gender was a confounding variable.

Randomisation was used to control the confounding variable. Both male and female respondents were sampled randomly. Stratification was also used, which gave the researcher the opportunity to study and compare the difference between male and female respondents' knowledge, attitudes and behaviour towards HPV and the HPV vaccine.

3.6 ETHICAL CONSIDERATIONS

When humans are used as study respondents care must be taken in ensuring that their rights are protected (Polit & Beck 2012:166). Accordingly, the researcher obtained permission to conduct the study, obtained informed consent from the respondents, and observed the ethical principles of beneficence, respect for persons, autonomy and justice (Polit & Beck 2012:748).

Permission: The researcher obtained permission to conduct the study from the Ministry of Health Research Unit (Botswana) and from the Research and Ethics Committee of the Department of Health Studies, University of South Africa (see Annexures A, B and C). The ethical clearance certificate number is HSHDC/679/2017.

Beneficence and non-maleficence: The right to protection from discomfort and harm is based on the ethical principle of beneficence, which holds that one should do good and, above all, do no harm. Beneficence imposes an obligation on researchers to minimise harm and maximise benefits. The respondents were assured that their participation or information they might provide would not be used against them in any way. There were no anticipated negative effects for the respondents, as the study was non-experimental.

Justice: The right to fair treatment is based on the ethical principle of justice. This principle holds that each person should be treated fairly and should receive what he or she is due or owed (Polit & Beck 2012:172). In this study, the respondents' selection was fair as they were selected for reasons directly related to the problem being studied.

Autonomy: This principle includes the right to self-determination and the right to full disclosure. The right to self-determination is based on the ethical principle of respect for persons and indicates that people are capable of controlling their own destiny. The respondents' right to self-determination was ensured by explaining the purpose and significance of the study to them; obtaining their informed consent; emphasising that participation was free and voluntary, and that they had the right to withdraw from the study at any time without the risk of penalty or prejudicial treatment (Polit & Beck 2012:171). When the respondents agreed to participate, they signed the consent form and the interview started. Respondent's responses were recorded on the questionnaire.

The respondents were assured of privacy, confidentiality and anonymity. Anonymity was assured as no names were written on the questionnaire. The data was treated in strictest confidence and kept under lock and key. No one had access to the data.

3.7 CONCLUSION

This chapter discussed the research design and methodology used in the study. The researcher selected a quantitative, descriptive cross-sectional design and the respondents were parents with adolescent girls aged 9-13 years living in Sefhare, Botswana. The chapter briefly described the data collection and analysis, validity, and the ethical considerations upheld in the study.

Chapter 4 discusses the data analysis and interpretation and findings.

CHAPTER 4

DATA ANALYSIS AND INTERPRETATION AND FINDINGS

4.1 INTRODUCTION

This chapter discusses the data analysis and interpretation, and findings. Data was collected by means of face-to-face-interviews using a structured questionnaire. The study focused on the respondents' knowledge, attitudes and behaviour towards HPV and the HPV vaccine.

4.2 DATA MANAGEMENT AND ANALYSIS

Data analysis refers to the systematic organisation and synthesis of research data and the testing of research hypotheses using those data (Polit & Beck 2012:215). The process involves reducing collected data to a manageable size, developing summaries, identifying patterns and applying statistical techniques.

Numerical coding was used for the data collected. For example, in the demographic data, 1 was used for 'male' and 2 for 'female'; the four wards were coded as 1, 2, 3, and 4, respectively. The responses to educational level and marital status were also coded individually. Knowledge was measured using an ordinal scale where responses were scored as 1 for 'yes', 2 for 'no' and 3 for 'no idea'. Attitudes were measured using a 4-point Likert scale, where 1 indicated 'strongly disagree'; 2 was 'disagree', 3 was 'agree' and 4 was 'strongly agree'. An ordinal scale was also used to measure behaviour, namely 1 for 'yes', 2 for 'no' and 3 for 'not applicable' or 'not sure'.

The statistician created a statistical database using the statistical package for social sciences (SPSS) version 19.0 software, and entered the data from the questionnaire. The variables measured were knowledge, attitudes and behaviour. Inferential statistics were used. Inferential analysis of variance (ANOVA) was used to test the relationship between knowledge, attitude and behaviour (Sullivan 2012:152). One-way ANOVA determined whether there was a significant difference in educational level regarding attitudes and behaviour towards HPV and the HPV vaccine. The responses were

scored on a 4-point Likert scale and coded consistently with the respondents' responses. The Chi-square was calculated to measure associations and compare knowledge, attitudes and behaviour between males and females. Percentages were calculated for knowledge, attitudes, and behaviour and compared between wards.

4.3 RESULTS

The results are presented according to the sections on the questionnaire.

4.3.1 Respondents' demographic data

The demographic data included gender, age, level of education, occupation, and marital status.

4.3.1.1 Gender

Of the respondents, 78% (n=78) were females and 22% (n=22) were males.

4.3.1.2 Age

The respondents' age distribution ranged from 25 to 45 and above. Of the respondents, 10% (n= 10) were 25-29; 15% (n= 15) were 30-34; 25% (n= 25) were 35-39; 44% (n=44) were 40-44, and 6% (n= 6) were 45 and above.

The respondents' daughters were aged 9 to 13. Of the daughters, 17% (n=17) were 9 years old; 18% (n=18) were 10; 23% (n=23) were 11; 24% (n=24) were 12, and 18% (n=18) were 13 years old.

4.3.1.3 Level of education

Of the respondents, 4% (n=4) had never been to school; 29% (n= 29) had been to primary school; 40% (n=40) had passed secondary school, and 27% (n= 27) had a tertiary education.

4.3.1.4 Occupation

Of the respondents, 49% (n=49) were unemployed; 8% (n=8) self-employed, and 43% (n= 43) were employed.

4.3.1.5 Marital status

Of the respondents, 61% (n=61) were single; 28% (n=28) were married; 5% (n=5) were divorced, and 6% (n=6) were widowed.

4.3.1.6 Wards

Four wards in the Sefhare village participated in the study, namely Bobirwa (ward 1), Maifala (ward 2), Sefhare (ward 3) and Seruleng (ward 4), respectively. Twenty five parents from each ward participated in the study. Table 4.1 presents the respondents' demographic data.

Table 4.1 Respondents' demographic data

		Frequency	Percent
Gender	Male	22	22
	Female	78	78
	Total	100	100
Age	25-29 years	10	10
	30-34 years	15	15
	35-39 years	25	25
	40-44 years	44	44
	45 and above	6	6
	Total	100	100
Level of education	Never been to school	4	4
	Primary	29	29
	Secondary	40	40
	Tertiary	27	27
	Total	100	100
Occupation	Unemployed	49	49
	Self-employed	8	8
	Employed	43	43
	Total	100	100
Marital status	Single	61	61
	Married	28	28
	Divorced	5	5
	Widowed	6	6
	Total	100	100

4.3.2 Knowledge about HPV

This section discusses the respondents' knowledge about HPV, HPV infection, cervical cancer and the HPV vaccine, and their attitudes and behaviour.

4.3.2.1 Knowledge about HPV infection

Of the respondents, 76% (n=76) had heard about HPV infection from different sources namely, from a friend (2%; n=2); a health worker (59%; n=59); the media (13%, n=13), and other sources (2%; n=2). In this case 'other' referred to information from children.

Regarding whether HPV can be transmitted through sex, 54% (n=54) of the respondents answered 'yes'; 19% (n =19) answered 'no', and 27% (n=27) had 'no idea' or were 'not sure'.

Regarding whether HPV infection can cause cervical cancer, 68% (n=68) said 'yes'; 6% (n=6) said 'no', and 26% (n=26) had 'no idea'. Regarding whether a condom partially protects one from contracting HPV infection, 54% (n=54) said 'yes' and 20% (n=20) said 'no'. Of the respondents, 71% (n=71) said 'yes'; 3% (n=3) said 'no', and 26% (n=26) had 'no idea' or were 'not sure' whether HPV could be prevented. Of the respondents, 72% (n=72) said 'yes'; 2% (n=2) said 'no', and 26% (n=26) had 'no idea' whether multiple sex partners increase the risk of acquiring HPV. Figure 4.1 depicts the respondents' knowledge about HPV infection.

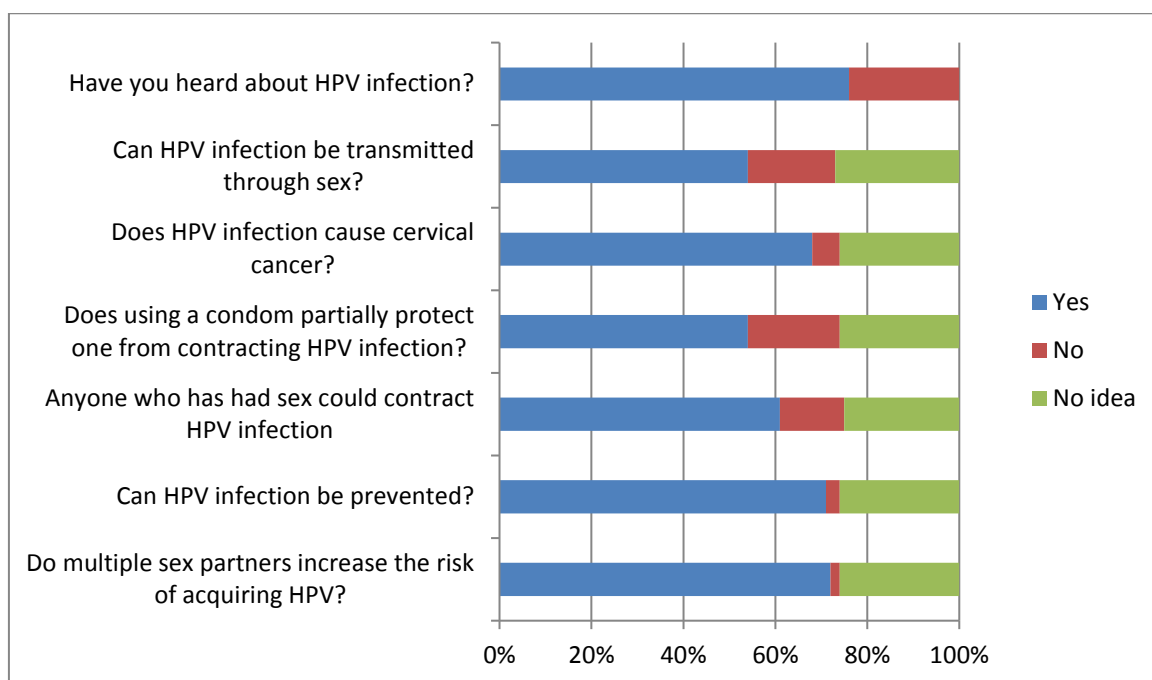


Figure 4.1 Respondents' knowledge about HPV infection

4.3.2.2 Knowledge about cervical cancer

Of the respondents, 98% (n=98) had heard about cervical cancer from various sources, namely a friend (10%; n=10), a health worker (76%; n=76), and the media (12%; n=12). All the respondents who had heard about cervical cancer believed that it is a serious disease and can cause death. Of the respondents, 91% (n=91) knew that cervical cancer is caused by HPV and 94% (n=94) knew that it can be prevented. Of the respondents, 76% (n=76) knew that the Pap smear is used to detect cervical cancer; 18% (n=18) said 'no', and 6% (n=6) had 'no idea'.

Of the respondents, 54% (n=54) knew that Pap smear is done 2-3 years, 39% (n=39) said 'no' and 7% (n=7) had no idea. Of the respondents, 93% (n=93) knew that cervical cancer can be treated if diagnosed early. Regarding whether cervical cancer can threaten the relationship between partners, 88% (n=88) said 'yes', 11% (n=11) said 'no' and 1% (n=1) had no idea. Of the respondents, 68% (n=68) knew anyone who has/had cervical cancer, and 32% (n=32) said 'no'. Figure 4.2 presents the respondents' knowledge about cervical cancer.

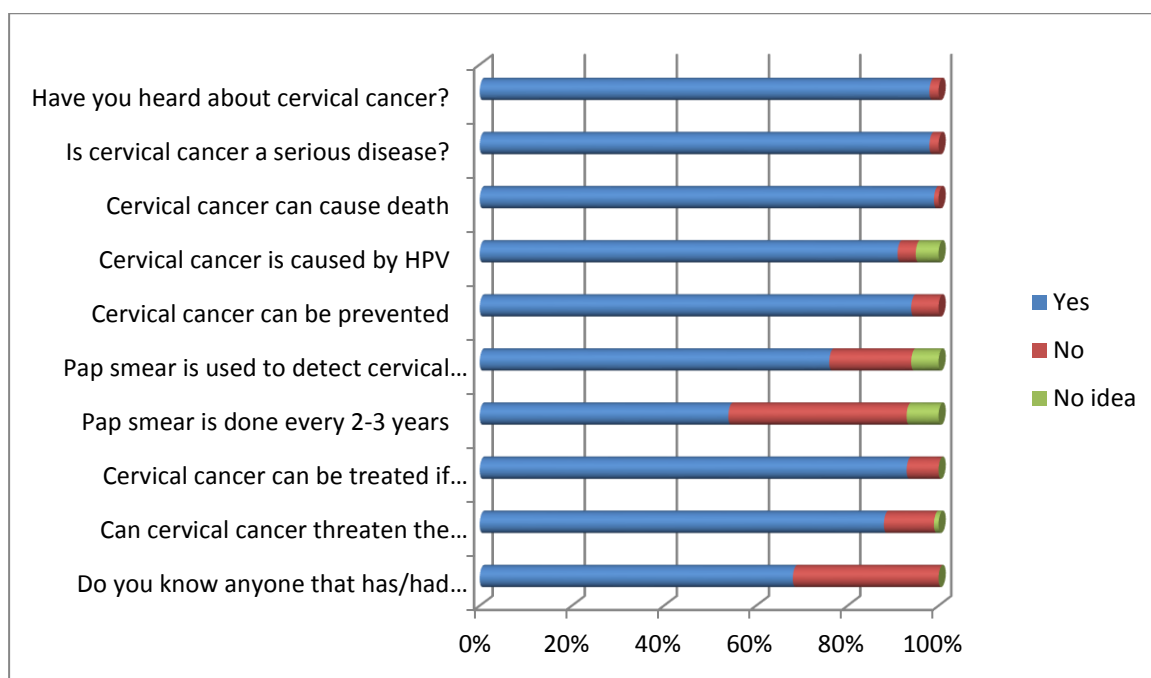


Figure 4.2 Respondents' knowledge about cervical cancer

4.3.2.3 Knowledge about the HPV vaccine

Of the respondents, 80% (n=80) had heard about the HPV vaccine from various sources, namely 12% (n=12) had heard from a friend, 59% (n=59) from a health worker, and 16% (n=16) from the media. Of the respondents, 80% (n=80) knew that the HPV vaccine is used to prevent cervical cancer; 30% (n=30) knew the dosage intervals of the vaccine while 70% (n=70) did not, and 71% (n=71) said that they had been told about the benefits of a girl being vaccinated.

Of the respondents, 37% (n=37) knew the adverse effects of the vaccine while 60% (n=60) did not. Finally, 83% (n=83) knew that the HPV vaccine is offered free by the government. Figure 4.3 depicts the respondents' knowledge about the HPV vaccine.

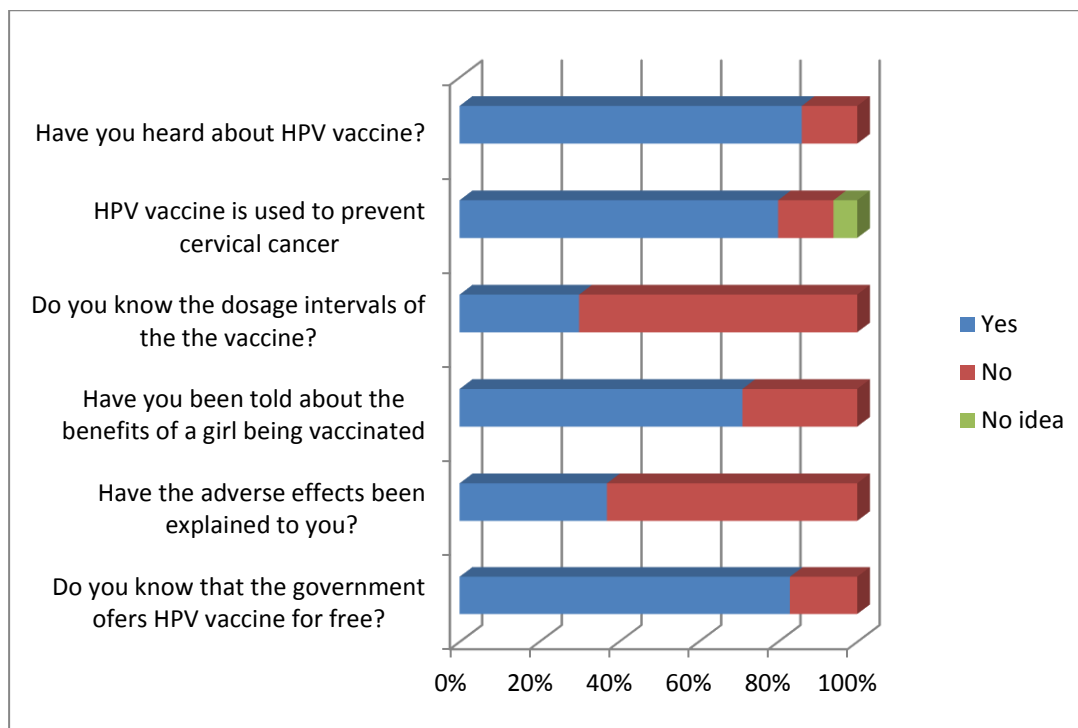


Figure 4.3 Respondents' knowledge about the HPV vaccine

4.3.2.4 Attitude towards the HPV vaccine

Of the respondents, 75% (n=75) strongly agreed that they feel confident in taking their daughters for HPV vaccination, while 25% (n=25) agreed. Of the respondents, 78% (n=78) strongly agreed that there are health benefits for getting the HPV vaccine while 22% (n=22) agreed. Of the respondents, 69% (n=69) strongly agreed that the HPV vaccine is effective in preventing cervical cancer and 31% (n=31) agreed. Of the respondents, 40% (n=40) strongly agreed that they have no problem in telling their children if they have cervical cancer and 38% (n=38) agreed. Of the respondents, 43% (n=43) strongly agreed; 36% (n=36) agree while 18% (n=18) disagreed that the HPV vaccine prevents HPV and STDs (sexually-transmitted diseases). Of the respondents, 73% (n=73) strongly disagreed that the HPV vaccine can cause infertility and 9% (n=9) agreed.

Of the respondents, 55% (n=55) strongly agreed that the vaccine is best administered before sexual intercourse and 32% (n=32) agreed. With regard to the doses, 52% (n=52) strongly agreed and 46% (n=46) agreed. Of the respondents, 31% (n=31) agreed, 38% (n=38) disagreed and 2% (n=2) strongly disagreed that the HPV vaccine information was clearly explained. Of the respondents, 29% (n=29) strongly agreed that

the HPV vaccine was clearly publicised or disseminated. Figure 4.4 illustrates the respondents' attitudes towards the HPV vaccine.

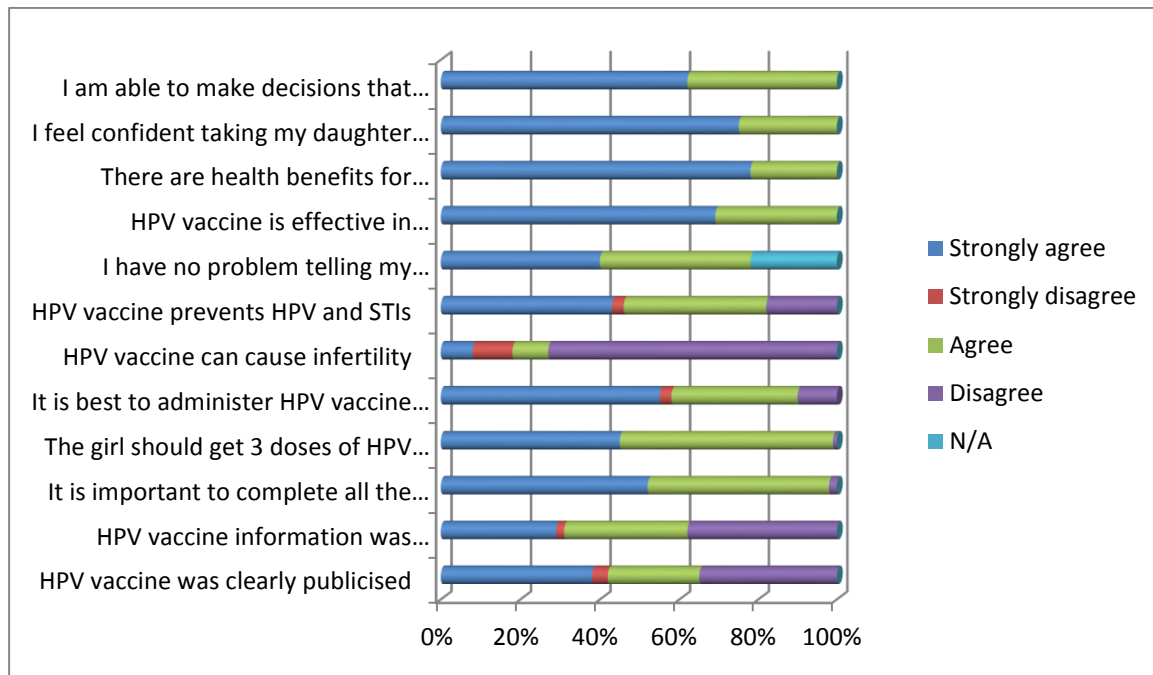


Figure 4.4 Respondents' attitudes towards the HPV vaccine

One-way ANOVA was used to test the relationship between the respondents' level of education and attitudes towards the HPV vaccine. To evaluate the relationship, p-value/significance was calculated, such that if it is below 0.1, the conclusion is that there is relationship. A significance of 0.074 was obtained for the question 'HPV is effective in preventing cervical cancer'. A significance of 0.036 was seen in the question 'the girl should get three doses of HPV vaccine'. The question 'it is important to complete all 3 doses' obtained a significance of 0.008. A slight significance of 0.124 was found in the question 'HPV vaccine can cause infertility'. The results showed a slight significance of 0.139 in the question 'there are health benefits for getting HPV vaccine'. Table 4.2 shows the one-way ANOVA results.

Table 4.2 One-way ANOVA for respondents' education vs attitude

Parameter	Mean square	Df	F	Sig
1. I am able to make decisions that affect my household	.300	3	1.273	.288
2. I feel confident taking my daughter for HPV vaccination	.155	3	.813	.490
3. There are health benefits for getting the HPV vaccine	.317	3	1.877	.139
4. HPV vaccine is effective in preventing cervical cancer	.495	3	2.388	.074
5. HPV vaccine prevents HPV and STIs	.996	3	1.440	.236
6. HPV vaccine can cause infertility	.942	3	1.968	.124
7. It is best to administer HPV	.367	3	.581	.629
8. The girl should get 3 doses of HPV vaccine	.753	3	2.963	.036
9. It is important to complete all 3 doses	1.127	3	4.224	.008
10. HPV vaccine information was clearly explained	1.184	3	1.629	.188
11. HPV information was clearly publicised	.608	3	1.629	.571

4.3.2.5 Behaviour towards HPV vaccine

Of the respondents, 53% (n=53) had immunised their daughters and 39% (n=39) had not, while 8% (n=8) were not sure whether the child had been vaccinated or not. All the respondents who did not immunise their daughters intended to take their daughters for vaccination, including those who were not sure about the immunisation status of their children.

The study found that 21% (n=21) of the respondents' daughters had completed all the vaccine doses; 25% (n=25) had not, and 10% (n=10) of the respondents were not sure.

All the respondents whose daughters had not completed the doses said they would take their daughters for the remaining doses. Of the respondents, 91% (n=91) said they would encourage other parents to take their daughters for immunisation. Furthermore, 98% (n=98%) had no cultural or spiritual beliefs that prevented them having their daughters vaccinated. Figure 4.5 illustrates the respondents' behaviour towards the HPV vaccine.

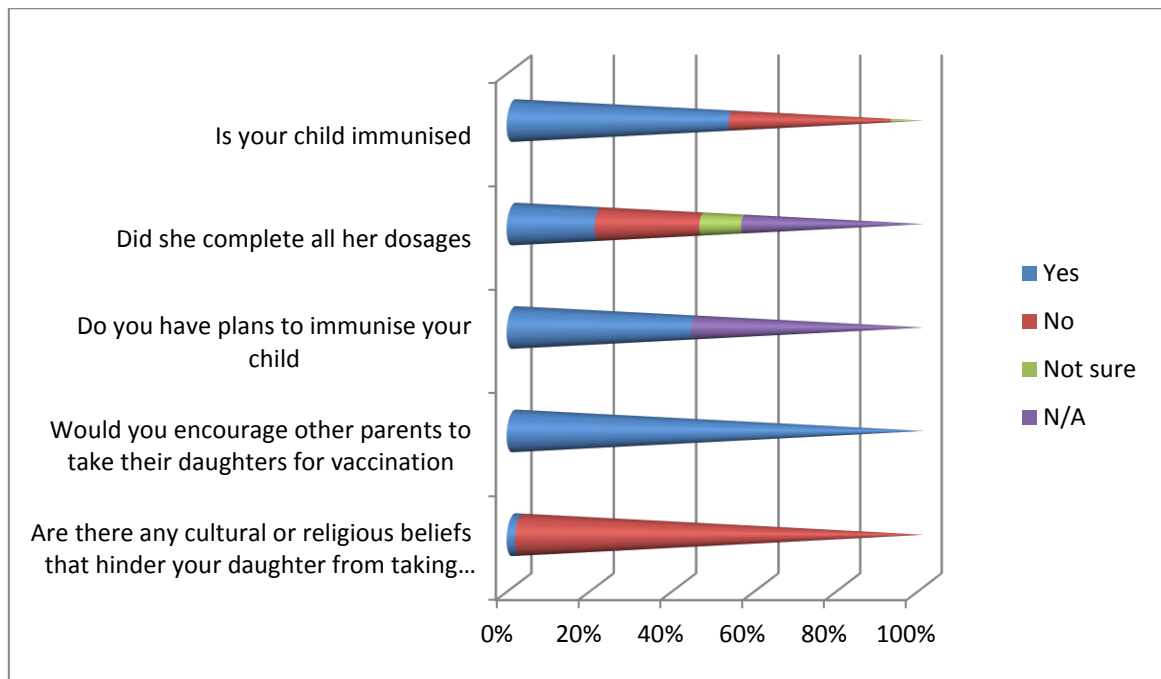


Figure 4.5 Respondents' behaviour towards the HPV vaccine

Regarding the HPV vaccine uptake, of the respondents' daughters, 53% (n=53) had been vaccinated; 39% (n=39) had not, and 8% (n=8) were not certain. Of the girls who had been vaccinated: 2 were 9 years old; 3 were 10 years old; 8 were 11 years old; 23 were 12 years old, and 17 were 13 years old. Table 4.3 lists the age and immunisation status of the girls.

Table 4.3 Age of child and immunisation status (HPV vaccine uptake)

Age of child	Yes	No	Not sure	Total
9 years	2	13	2	17
10 years	3	14	1	18
11 years	8	10	5	23
12 years	23	1	0	24
13 years	17	1	0	18
Total	53	39	8	100

One-way ANOVA was used to test the relationship between the respondents' level of education and behaviour towards the HPV vaccine. To evaluate the relationship between their level of education and attitudes, p-value/significance was calculated, such that if it is below 0.1 the conclusion is that there is a relationship. The results showed a significance of 0.381 for the question whether the child had been immunised. A significance of 0.491 was obtained for the question whether parents would encourage

other parents to take their daughters for immunisation. A significance of 0.140 was also obtained for the question whether there were cultural or religious beliefs that hindered HPV vaccination of their daughters. Table 4.4 shows the ANOVA results of respondents' level of education and behaviour.

Table 4.4 Respondents' level of education and behaviour towards HPV vaccine

Parameter	Mean square	Df	F	Sig
Is your child immunised?	.425	3	1.035	.381
Would you encourage other parents to take their daughters for vaccination?	.008	3	.811	.491
Are there any cultural or religious beliefs that hinder your daughter from taking the HPV vaccine?	.036	3	1.869	.140

The results indicated that of the respondents, 65.1% (n=65) knew about HPV infection; 86% (n=86) knew about cervical cancer, and 64.5% (n=64) knew about the HPV vaccine. Of the respondents, 81.5% (n=81) had a positive attitude towards the HPV vaccine and 62.4% (n=62) showed positive behaviour towards the HPV vaccine. Table 4.5 indicates the overall results of the respondents' knowledge, attitudes and behaviour towards HPV/HPV vaccine.

Table 4.5 Respondents' overall knowledge, attitude and behaviour towards HPV/HPV vaccine

Variable	Percentage
Knowledge about HPV infection	65.1
Knowledge about cervical cancer	86.0
Knowledge about HPV vaccine	64.5
Attitude towards HPV vaccine	81.5
Behaviour towards HPV vaccine	62.4

4.3.3 Ward results

Parents from four wards in Sefhare village took part in the study, namely Bobirwa (ward 1), Maifala (ward 2), Sefhare (ward 3) and Seruleng (ward 4). It should be noted that there is a ward in Sefhare village which is called Sefhare. The parents from the four

wards were compared to determine their level knowledge, attitudes and behaviour towards HPV/HPV vaccine. The following sections discuss the results.

4.3.3.1 Ward 1 (Bobirwa)

The results show that of the 25 respondents from ward 1 (Bobirwa), 21 had a high knowledge of HPV infection; 13 knew that HPV infection can be transmitted through sex; 19 knew that HPV infection can be prevented, and 20 knew that multiple partners increase the risk of acquiring HPV. Of the respondents, 24 had heard about cervical cancer; all (25) believed that cervical cancer is a serious disease and can cause death; 24 knew that cervical cancer is caused by HPV and all (25) knew that cervical cancer can be prevented. Of the respondents, 23 knew that cervical cancer can be treated if diagnosed early and 18 knew someone who had cervical cancer.

Of the respondents, 23 had heard about the HPV vaccine; 19 knew that the vaccine is used to prevent cervical cancer; 9 knew the dosage intervals for the HPV vaccine, and 17 knew of the benefits of girls being vaccinated.

The respondents from ward 1 showed a positive attitude; 19 strongly agreed and 6 agreed that they felt confident in taking their daughters for vaccination.

Of the respondents, 20 strongly agreed and 5 agreed that there are health benefits of getting HPV vaccine.

Of the respondents, 14 strongly agreed and 8 agreed that it is best to administer the HPV vaccine before sexual initiation, and 25 agreed that it is important to complete all the doses. Of the respondents, 11 disagreed and 1 strongly disagreed that the HPV information was clearly explained.

Of the respondents, 12 girls had been vaccinated in ward 1 and 4 had completed the dosages. All the parents whose daughters had not been immunised intended to immunise them, including those whose daughters did not complete the doses.

4.3.3.2 Ward 2 (Maifala)

Of the respondents in ward 2 (Maifala), 18 were aware and knew about HPV infection, and 14 knew that HPV infection can be transmitted through sex.

Of the respondents, 17 knew that HPV causes cervical cancer; 18 knew that it can be prevented by vaccination with the HPV vaccine, and 17 knew that multiple sex partners can put one at risk of contracting the HPV infection.

Of the respondents, 25 had heard about cervical cancer and knew that it is a serious disease; 24 knew that cervical cancer can cause death; 22 knew that cervical cancer is caused by HPV; 24 knew that cervical cancer can be prevented, and 24 knew that cervical cancer can be treated if diagnosed early.

Of the respondents, 20 had heard about the HPV vaccine; 18 knew that the HPV vaccine is used to cervical cancer, and 8 knew the dosage interval for the HPV vaccine. Of the respondents, 19 said that they had been told about the benefits of vaccinating their daughters, and 11 said that the adverse effects of the HPV vaccine had been explained to them.

The respondents showed a positive attitude towards the HPV vaccine and 19 strongly agreed and 6 agreed that they felt confident to take their daughters for vaccination. Of the respondents, 25 felt that there are health benefits for getting the HPV vaccine; 18 strongly agreed and 7 agreed that the HPV vaccine is effective in preventing cervical cancer, and 12 strongly agreed and 10 agreed that is best to administer the HPV vaccine before sexual initiation.

Of the respondents, 12 strongly agreed and 13 agreed that it is important to complete all the doses. Regarding explanation of the HPV vaccine, 7 agreed that it was clearly explained to them, while 8 strongly disagreed and 10 disagreed.

Of the respondents' daughters, 15 had been vaccinated and 6 had completed the doses. The respondents whose daughters had not yet been vaccinated expressed their willingness to have them vaccinated. All the respondents would encourage other

parents to take their daughters for vaccination. There were no cultural or religious beliefs that hindered the respondents from vaccinating their daughters.

4.3.3.3 Ward 3 (Sefhare)

Of the respondents in ward 3 (Sefhare), 20 were aware of HPV infection; 14 knew that it causes cervical cancer; 17 knew that HPV can be prevented, and 18 knew that multiple sex partners put one at risk of contracting HPV.

Of the respondents, 24 were aware of cervical cancer; 24 knew that cervical cancer can be prevented, and 23 said cervical cancer can be treated if diagnosed early.

Of the respondents, 19 knew or had seen someone with cervical cancer; 22 had heard about the HPV vaccine, and 24 knew that the HPV vaccine is used to prevent cervical cancer. Of the respondents, 18 did not know about dosage intervals and 15 did not know the adverse effects of the HPV vaccine.

The respondents of ward 3 also showed a positive attitude towards the HPV vaccine. Of the respondents, 16 strongly agreed and 6 agreed that they felt confident in taking their daughters for vaccination; 17 strongly agreed and 8 agreed that there are health benefits for a girl to be vaccinated; 14 strongly agreed and 11 agreed that HPV is effective in preventing cervical cancer. Of the respondents, 13 strongly agreed and 12 agreed that girls should complete all the doses.

Of the respondents, 12 had vaccinated their daughters, but 6 of them did not complete the doses. Those who did not vaccinate their daughters were willing and intended to immunise them. There were no cultural or religious beliefs that hindered the respondents from vaccinating their daughters.

4.3.3.4 Ward 4 (Seruleng)

The respondents in ward 4 (Seruleng) showed a good level of awareness and knowledge about HPV infection. Of the respondents, 17 had heard about HPV; 16 knew that HPV causes cervical cancer; 17 knew that HPV can be prevented, and 17 knew that multiple sex partners put one at risk of contracting HPV.

There was a high level of awareness and knowledge about cervical cancer. Of the respondents, 25 had heard about cervical cancer; 21 knew that cervical cancer can be prevented; 23 knew that when diagnosed early it can be prevented; 16 knew that a Pap smear is used to detect cervical cancer; 14 knew the time interval for doing a Pap smear, and 17 knew or had seen someone who had cervical cancer.

A positive attitude was also seen in ward 4. Of the respondents, 21 strongly agreed and 4 agreed that they feel confident to take their daughters for vaccination; 23 strongly agreed and 2 agreed that there are health benefits for girls to be vaccinated; 22 strongly agreed and 3 agreed that the HPV vaccine is effective in preventing cervical cancer. Finally, of the respondents, 16 strongly agreed, 7 agreed and 2 disagreed that it is important for girls to complete all the doses.

Of the respondents, 14 had vaccinated their daughters but 7 did not complete the doses. All respondents who had not vaccinated their daughters were willing to have them immunised. Those with daughters that had not completed the doses also intended to have them complete the dosages. There are no cultural or religious beliefs that hinder vaccination of daughters.

The respondents' knowledge of the HPV vaccine from the four wards was calculated. Table 4.6 summarises the percentage distribution.

Table 4.6 Percentage distribution of respondents' knowledge of HPV in the wards

Factor	Ward 1	Ward 2	Ward 3	Ward 4	Total
Knowledge about HPV infection	26.2	24.8	25.1	23.9	100.0
Knowledge about cervical cancer	24.9	26.1	24.4	24.6	100.0
Knowledge about HPV vaccine	26.1	25.3	27.4	21.2	100.0

Table 4.7 lists the respondents' attitudes scores from the four wards.

Table 4.7 Percentage distribution of respondents' attitude towards the HPV vaccine in the wards

Parameter	Ward 1	Ward 2	Ward 3	Ward 4	Total
1. I am able to make decisions that affect my household					
Agree	23.7	26.3	18.4	31.6	100.0
Strongly agree	25.8	24.2	29.0	21.0	100.0
2. I feel confident in taking my daughter for HPV vaccination					
Agree	24.0	24.0	36.0	16.0	100.0
Strongly agree	25.3	25.3	21.3	28.0	100.0
3. There are health benefits for getting HPV vaccine					
Agree	22.7	31.8	36.4	9.1	100.0
Strongly agree	25.6	23.1	21.8	29.5	100.0
4. HPV vaccine is effective in preventing cervical cancer					
Agree	32.3	22.6	35.5	9.7	100.0
Strongly agree	21.7	26.1	20.3	31.9	100.0
5. I have no problem telling my child if I have cervical cancer					
6. HPV vaccine prevents HPV and STIs					1
Strongly disagree	66.7	0.0	33.3	0.0	100.0
Disagree	38.9	11.1	22.2	27.8	100.0
Agree	27.8	30.6	33.3	8.3	100.0
Strongly agree	14.0	27.9	18.6	39.5	100.0
7. HPV vaccine can cause infertility					
Strongly disagree	20.0	20.0	40.0	20.0	100.0
Disagree	24.7	27.4	26.0	21.9	100.0
Agree	22.2	22.2	22.2	33.3	100.0
Strongly agree	37.5	12.5	0.0	50.0	100.0
8. It is best to administer HPV vaccine before sexual initiation					1
Strongly disagree	0.0	66.7	0.0	33.3	100.0
Disagree	30.0	10.0	20.0	40.0	100.0
Agree	25.0	31.3	28.1	15.6	100.0
Strongly agree	25.5	21.8	25.5	27.3	100.0
9. The girl should get 3 doses of HPV vaccine					
Disagree	0.0	0.0	0.0	100.0	100.0
Agree	25.9	31.5	25.9	16.7	100.0
Strongly agree	24.4	17.8	24.4	33.3	100.0

Parameter	Ward 1	Ward 2	Ward 3	Ward 4	Total
10. It is important to complete all 3 doses					
Disagree	0.0	0.0	0.0	100	100.0
Agree	30.4	28.3	26.1	15.2	100.0
Strongly agree	21.2	23.1	25.0	30.8	100.0
11. HPV vaccine information was clearly explained					
Strongly disagree	50.0	0.0	50.0	0.0	100.0
Disagree	28.9	26.3	23.7	21.1	100.0
Agree	16.1	22.6	32.3	29.0	100.0
Strongly agree	27.6	27.6	17.2	27.6	100.0
12. HPV information was clearly publicised					
Strongly disagree	25.0	25.0	0.0	50.0	100.0
Disagree	34.3	25.7	17.1	22.9	100.0
Agree	13.0	17.4	47.8	21.7	100.0
Strongly agree	23.7	28.9	21.1	26.3	100.0

Table 4.8 shows the respondents' behaviour from the four wards.

Table 4.8 Percentage distribution of respondents' behaviour towards the HPV vaccine

Factor	Ward 1	Ward 2	Ward 3	Ward 4	Total
Immunised child	22.6	28.3	22.6	26.4	100.0
Child who completed dosages	19.0	28.6	23.8	28.6	100.0
Plans to immunise child	22.7	22.7	29.5	25.0	100.0
Encourage other parents to vaccinate their daughters	25.3	25.3	24.2	25.3	100.0

4.4 COMPARISON BETWEEN MALE AND FEMALE

The Chi-square test was used to compare knowledge of HPV between males and females. The results below are based on Pearson's chi-square. To compare the knowledge *r-value* was observed. Pearsons' *r-value* can be descriptive or inferential. Descriptively, the correlation coefficient summarises the magnitude and direction of a relationship between two variables (Polit & Beck 2012:421). If the computed *r-value* is high than the tabled *r* at 0.1 significance, the null hypothesis is rejected. The null hypothesis is that there is no relation between gender and knowledge/attitude/behaviour.

The comparison between males and females found the following results obtained when comparing males and females. Knowledge about HPV infection: an r -value of 0.945 with $df = 1$ was obtained for the question 'have you heard of HPV infection', which is lower than the tabled r -value 0.98769. For the question 'can HPV be transmitted through sex' an r -value of 0.671 was obtained with $df = 2$. This is lower than the tabled 0.90000. The question 'does HPV infection cause cervical cancer' obtained r -value of 1.146 with $df = 2$. This is higher than the tabled 0.90000. An r -value of 1.245 with $df = 2$, which is higher than 0.90000, was obtained for the question 'can HPV infection be prevented'. Questions 2,4,6,7 and 8 obtained r -values higher than the tabled r -values. Table 4.9 presents the chi-square results of knowledge between the males and females.

Table 4.9 Knowledge about HPV infection between males and females

Variable	Males	Females	Df	Value
Have you heard about HPV infection	19.7	80.3	1	.945
Can HPV infection be transmitted through sex	22.2	77.8	2	.671
Does HPV infection cause cervical cancer	19.1	80.9	2	1.146
Does using a condom partially protect one from contracting HPV infection	20.4	79.6	2	.497
Anyone who has sex could contract HPV infection	24.6	75.4	2	2.098
Can HPV infection be prevented	21.1	78.9	2	1.245
Do multiple sex partners increase the risk of acquiring HPV	19.4	80.6	2	1.555

Knowledge about cervical cancer was also compared between male and female respondents. The results showed an r -value of 0.932 with $df = 1$ for the question 'have you had about cervical'. The question 'is cervical cancer a serious disease' obtained an r -value of 0.576 with $df = 1$ which was less than the tabled 0.98769. An r -value of 2.790 with $df = 2$ was obtained for 'cervical cancer is caused by HPV'. This was more than the tabled 0.90000. The question 'cervical cancer can be prevented' obtained an r -value of 1.800 with $df = 1$, which was higher than the tabled 0.90000. Questions 10, 12,13,16,17 and 19 obtained an r -value below the tabled r -values.

Table 4.10 Knowledge of cervical cancer between males and females

Variable	Males	Females	Df	Value
Have you heard about cervical cancer	21.4	78.6	1	.932
Is cervical cancer a serious disease	22.4	77.6	1	.576
Cervical cancer can cause death	22.2	77.8	1	.285
Cervical cancer is caused by HPV	24.2	75.8	2	2.790
Cervical cancer can be prevented	23.4	76.6	1	1.80
Pap smear is used to detect cervical cancer	21.1	78.9	2	.489
Pap smear is done every 2-3 years	20.4	79.6	2	.628
Cervical cancer can be treated if diagnosed early	20.4	79.6	1	1.908
Cervical cancer can threaten the relationship between partners	22.7	77.3	2	.403
Do you know anyone that has/had cervical cancer	19.1	80.9	1	1.029

A comparison of knowledge about HPV vaccine was made between male and female respondents. The results show an r-value of 0.291 with $df=2$ for the question 'have you had about HPV vaccine', which was less than the tabled 0.90000. An r-value of 1.838 with $df=2$ was obtained for question 'HPV vaccine is used to prevent cervical cancer', which was higher than the tabled 0.90000. The question 'do you know the dosage interval of the vaccine' obtained an r-value of 0.710 with $df=1$, which was less than the tabled 0.98769. The question 'have adverse effects been explained to you' obtained an r-value of 0.911 with $df=2$, which was higher than the tabled 0.90000. Questions 22, 23, 25, 26 and 27 obtained an r-value above the tabled r-values.

Table 4.11 Knowledge about HPV vaccine between males and females

Variable	Males	Females	Df	Value
Have you heard about HPV vaccine	22.1	77.9	2	.291
HPV vaccine is used to prevent cervical cancer	23.8	76.2	2	1.838
Do you know the dosage intervals of HPV vaccine	16.7	83.3	1	.710
Have you been told about the benefits of a girl being vaccinated	26.8	73.2	2	3.442
Have the adverse effect been explained to you	21.6	78.4	2	.911
Do you know that the government offers HPV vaccine free	25.3	74.5	2	3.146

A comparison of the male and female respondents' attitudes towards the HPV vaccine revealed an r -value of 0.699 with $df=1$. This was lower than the tabled 0.98769. An r -value of 0.240 with $df=1$ was obtained for the question 'there are health benefits for getting HPV vaccine', which was lower than the tabled 0.98769. Questions 2, 3, 4, 7, 9, and 10 obtained r -values below the tabled r -values. The question 'HPV vaccine is effective in preventing cervical cancer' obtained an r -value of 0.183 with $df=1$, which was lower than the tabled 0.98769. An r -value of 1.515 with $df=3$ was obtained for the question 'it is important to administer HPV vaccine before sexual initiation', which was higher than the tabled 0.8054. An r -value of 0.285 with $df=2$ was obtained for the question 'the girl should get three doses of HPV vaccine', which was lower than the tabled 0.90000. The question 'HPV vaccine information was clearly explained' obtained an r -value of 2.586 with $df=3$, which was higher than the tabled 0.8054.

The male and female respondents' behaviour towards the HPV vaccine was compared. Questions 1-4 obtained an r -value above the tabled r -values. An r -value of 1.449 with $df=2$ was obtained for the question 'is your child immunised', which was higher than the tabled 0.90000. An r -value of 3.581 with $df=1$ was obtained for the question 'would you encourage other parents to take their daughters for immunisation' which was higher than the tabled 0.98769. The question 'are there any cultural or religious beliefs that hinder your daughter from taking the vaccine' obtained an r -value of 0.576 with $df=1$, which was lower than the tabled 0.98769. Table 4.12 summarises the behaviour of the males and females towards the HPV vaccine.

Table 4.12 Behaviour towards HPV vaccine between males and females

Variable	Males	Females	Df	Value
Is your child immunised	18.9	881.1	2	1.449
Did she complete all the dosages	23.8	76.2	3	.819
Do you have plans to immunise your child	27.3	72.7	1	1.273
Would you encourage other parents to take their daughters for vaccination	21.2	78.8	1	3.581
Are there any cultural or religious beliefs that hinder your child from taking HPV vaccine	22.4	77.6	1	.576

4.5 CONCLUSION

This chapter discussed the data analysis and interpretation, and the results. The findings were also compared between the four wards and between male and female respondents.

Chapter 5 briefly discusses the findings, limitations and contribution of the study, and makes recommendations for practice and further research.

CHAPTER 5

FINDINGS, LIMITATIONS AND RECOMMENDATIONS

5.1 INTRODUCTION

This chapter summarises the findings, briefly discusses the limitations and contribution of the study and makes recommendations for practice and further research.

5.2 PURPOSE OF THE STUDY

The purpose of the study was to determine the knowledge, attitude and behaviour of parents towards HPV and the HPV vaccine in preventing cervical cancer in girls aged 9 to 13 years in Sefhare, Botswana. The study evaluated the uptake of the HPV vaccine and implementation of prevention strategy.

In order to achieve the purpose, the objectives of the study were to:

- Determine the level of knowledge of parents of adolescent girls between the ages of 9 to 13 years regarding HPV and HPV vaccine.
- Assess the attitudes of parents with adolescent girls aged 9 to 13 years towards HPV and the HPV vaccine and their willingness to take their daughters for vaccination.
- Determine parents' behaviour in uptake of the HPV vaccine.
- Make recommendations based on the findings.

5.3 FINDINGS

The first objective was to determine the respondents' level of knowledge of HPV/HPV vaccine. The findings indicate that, that was achieved as shown by parents' knowledge about HPV infection, cervical cancer and HPV vaccine. Awareness was raised in those who did not HPV/HPV vaccine. Knowledge gaps were identified and respondents given the necessary education.

5.3.1 Knowledge about HPV infection

The study found that 76% had heard about HPV; 65.1% had knowledge about HPV infection, and 68% knew that HPV causes cervical cancer. Source of information was 59% health workers while 13% heard from media. Thus only a small percentage of respondents were not aware of HPV infection. Lack of knowledge of HPV infection could lead to the spread of HPV and leave young girls at risk of contracting HPV infection.

Most of the respondents (71%) knew that HPV can be prevented and were aware that having multiple sex partners put one at risk of contracting HPV infection thus exposing one to cervical cancer. 61 % of the respondents knew that anyone who has had sex could contract the HPV infection. This is also shown by respondents' willingness to vaccinate and complete the dosages for their daughters.

The medium level of awareness and knowledge observed implies that the respondents and parents are more likely to comply with the HPV prevention strategy as they are aware of the HPV infection. The awareness and knowledge about HPV infection could be attributed to the work done by the Ministry of Health, health workers and media sensitisation about HPV and cervical cancer.

The results in this study complement those of Milimo et al (2015) conducted in Zambia. Milimo et al's (2015) study also found medium levels of awareness as shown by 64% of respondents who had heard about HPV and 69% stated that HPV causes cervical cancer.

The study by Ayissi et al (2012) in Cameroon shows higher results in some aspects of knowledge regarding HPV infection. The study by Ayissi et al (2012) showed that 82.3 % of respondents knew that everyone can contract the HPV infection and 75.9% were aware that HPV vaccine prevents HPV. Respondents in Ayissi et al study were knowledgeable and recommended that their daughters be vaccinated which indicated a positive relationship between knowledge and attitude. More likely, the reason why the respondents in the Ayissi et al's (2012) study displayed better knowledge than those in this study could be due to the much higher information dissemination (education) on HPV infection.

In contrast, the results of the study done by Yu et al in China (2016) showed that 58.69% of the respondents had low knowledge while 26.56 % had high knowledge. They found poor awareness and knowledge, and low acceptability of HPV and HPV vaccine. Kornfeld et al (2013) in USA found low levels of awareness and knowledge but that despite these, there was a positive attitude and behaviour towards HPV vaccine. The difference in the findings of this study and that of Yu et al could be due to insufficient provision of information in the case of China.

5.3.2 Knowledge about cervical cancer

There was high awareness and knowledge of cervical cancer. Of the respondents, 98% knew that cervical cancer is a serious disease and can pose a threat to the health of their daughters; 99% knew that cervical cancer can cause death; 91% knew that cervical cancer is caused by HPV, and 94% knew that it is preventable. 93% know that cervical cancer can be treated if diagnosed early; 76% knew that a Pap smear is used for cervical cancer detection; 53% knew the interval period for doing Pap smears, and 68% knew or had seen someone with cervical cancer. These factors contributed to respondents' positive attitude towards HPV vaccine.

The overall results show that 86% of the respondents are knowledgeable about cervical cancer, which indicates a high level of knowledge about cervical cancer. This implies that when parents are knowledgeable about cervical cancer, its seriousness and the threat it poses, they are most likely to comply with the HPV vaccine prevention strategy in order to prevent the disease. Ministry of Health, health workers and media have contributed to high awareness and knowledge about cervical cancer. Media, both television and radio sensitised the public about cervical cancer and advised early screening. Health workers also hold health talks in the communities they work in.

Ayissi et al (2015) in Cameroon also found high levels of awareness in cervical cancer as, 82.3% of respondents knew that certain genotypes of HPV cause cervical cancer and 75.6% knew that abnormal Pap test could be a sign of HPV infection. The high levels of awareness resulted in respondents recommending HPV vaccine as 45.6% strongly recommended and 33.1% recommended. The findings in the study by Ayissi et al (2015) indicate a positive attitude and behaviour.

Another study which showed knowledge about cervical cancer was conducted by Hussain et al in India (2014). It indicated that of the respondents, 69% of females and 31% of males knew about cervical cancer.

A contrary study which showed low knowledge about cervical cancer was done in France by Haesebaert et al (2012). In that study, 16.9% of respondents knew the causes of cervical cancer. The difference in the findings between the Haesebaert et al's (2012) study and this study could again be due to the intensity of information provision by the health workers and media on cervical cancer.

5.3.3 Knowledge about the HPV vaccine

The study found a high awareness and knowledge of the HPV vaccine. Of the respondents, 86% had heard of the HPV vaccine and 80% knew that it prevents cervical cancer. However, only 30% knew about the dosage intervals for the vaccine and 37% knew the adverse effects. The results indicate an average of 64.5% knowledge about the HPV vaccine, which is a medium level. Lower levels of knowledge were seen in dosage interval of the vaccine and adverse effects. Little knowledge of dosage intervals could lead to girls missing doses when they are due and/or incomplete doses. This could lead to reducing the government initiative of the prevention strategy against cervical cancer. Although the respondents did not know much about the vaccine dosages and adverse effects, they still believed that it is important for their daughters to be vaccinated. The respondents also knew that it is important for the vaccine to be given to daughters before sexual debut.

A study by Haesebaert et al (2012) in France revealed a similar result of a high awareness level (76.2%) of HPV vaccine. Ayissi et al (2012) in Cameroon also demonstrated high awareness results as evidenced by 75.9% being aware that HPV vaccine prevents cervical cancer.

In contrast, Hanley et al (2012) in Japan observed slightly lower levels of knowledge regarding HPV vaccine in the study, where 52.5% of mothers had heard about HPV vaccine. Kornfeld et al (2013) also observed slightly lower awareness (52.7%) of HPV vaccine. The lower levels of awareness and knowledge of HPV vaccine could be

because the respondents did not receive sufficient information (education) about HPV vaccine. However, despite low levels of awareness, most respondents showed a positive attitude to HPV vaccine as evidenced by their willingness to vaccinate their daughters.

5.3.4 Attitude towards the HPV vaccine

The second objective was to assess the respondents' attitudes towards the HPV vaccine. The study found a generally positive attitude towards the HPV vaccine. Of the respondents, 78% strongly agreed and 22% agreed that there are health benefits for getting HPV vaccine; 69% strongly agreed while 31% agreed that HPV vaccine is effective in preventing cervical cancer; 73% disagreed and 10% strongly disagreed while 8% strongly agreed and 9% agreed that HPV can cause infertility. Of the respondents, 45% strongly agreed, 54% agreed and 1% disagreed that a girl should take all 3 doses. Of the respondents, 52% strongly agreed, 46% agreed and only 2% disagreed that it is important to complete all 3 doses. Finally, of the respondents, 29% strongly agreed, 31% agreed, 38% disagreed and 2% strongly disagreed that HPV vaccine information was clearly explained.

The findings in this study demonstrate positive attitudes of parents towards HPV vaccine. This confirms what was alluded to by Ramogol-Masire (2014), that HPV vaccine was highly accepted if it became widely available. The parents' positive attitude towards HPV vaccine resulted in a positive behaviour as evidenced by parents' willingness to vaccinate their daughters. This showed a positive relationship between attitudes and behaviour.

The findings in this study affirm the factors or attributes of the Health Belief Model of perceived benefits and perceived vulnerability. The respondents perceived that there are health benefits of getting HPV vaccine to prevent cervical cancer. The respondents perceived that cervical cancer is a serious disease and that it was a threat to their daughters' good health. These perceptions influenced the respondents' behaviour to accept the HPV vaccine (or to take their daughters for vaccination) so as to reduce the threat of cervical cancer. The respondents' attitudes towards the HPV vaccine made it easy for them to vaccinate their daughters, thus protecting their health.

Almost all the studies discussed in the literature review showed that the respondents were in favour of HPV vaccine and that the vaccine was highly accepted. This was evidenced by the respondents' willingness to vaccinate their daughters. This indicates a positive relationship between attitude and knowledge.

To evaluate the relationship between education and attitudes, the p-value/significance was observed, such that if it is below 0.1 the conclusion is that there is relationship.

The relationship between education and attitude was demonstrated by a significance of 0.074 to the question 'HPV vaccine is effective in preventing cervical cancer'. Further significance was observed in the questions 'the girl should get all three doses of HPV vaccine' and 'it is important to complete all three doses'. The ANOVA test revealed that the respondents' educational level had an influence on their answering these questions. For the rest of the questions, the respondents' educational level did not seem to affect their attitude towards the vaccine. The respondents accepted the HPV vaccine the same way.

Generally, there was a high level of awareness and knowledge of HPV/HPV vaccine which resulted in a positive attitude. This shows that respondents' knowledge influenced their attitude thereby demonstrating an association between knowledge and attitude.

Of the respondents, 81.5% had a positive attitude towards the HPV vaccine. A positive attitude implies a positive behaviour and compliance with the HPV vaccine. The results show that most of the respondents did not agree that the HPV vaccine causes infertility, which shows a lack of knowledge. This, in turn, shows that the adverse effects were not explained and supports the 38% who disagreed and 2% who strongly disagreed that the HPV vaccine information was not clearly explained.

5.3.5 Behaviour towards HPV vaccine

The third objective was to determine the respondents' behaviour towards the HPV vaccine and HPV uptake. The objective was achieved as shown by respondents' behaviour and utilisation of the prevention strategy. Of the respondents, 53% had immunised their daughters; 21% had completed their dosages, and 99% would encourage other parents to take their daughters for vaccination. Respondents with less

HPV infection knowledge still had a positive behaviour towards the HPV vaccine and were willing to vaccinate their daughters.

Some respondents had vaccinated their daughters, and finished the doses. Those who did not vaccinate their daughters and those who did not receive all the doses expressed willingness to have their daughters complete or take the vaccine. Of the respondents, 98% had nothing hindering them from vaccinating their daughters, which is a positive behaviour. There was a significant relationship between respondents' behaviour and attitudes as evidenced by their intention to vaccinate their daughters and having their daughters vaccinated. The ANOVA showed no relationship between educational level and behaviour. All the respondents responded the same and showed the same behaviour.

The results generally showed that the respondents' behaviour towards the HPV vaccine was positive. The respondents' positive attitude resulted in positive behaviour. Both males and females showed positive behaviour. The positive behaviour towards the HPV vaccine implies that the preventive strategy is or will be utilised effectively.

This study has obtained similar results as other studies in the reviewed literature. Almost all the studies discussed reveal that respondents were in favour of HPV vaccine and showed a high acceptance of HPV vaccine. This was evidenced by the respondents' willingness to vaccinate their daughters. This indicates a positive relationship between attitude and knowledge.

5.4 COMPARISON BETWEEN MALE AND FEMALE RESPONDENTS

A comparison was made to determine the relationship between the answers given in terms of knowledge, attitude and behaviour between male and female respondents. The null hypothesis is that there is no relationship between knowledge/attitude/behaviour and gender. This means that gender differences are not important in knowledge about HPV infection, cervical cancer and HPV vaccine. Males and females may be similarly knowledgeable.

The first assessment was on the level of knowledge of males and females on HPV infection. The results show that most of the questions (5 out of 7) obtained a calculated

r-value higher than the tabled values. Question 2 calculated r-value is $2.816 > 0.7293$; question 4 calculated r-value is $1.146 > 0.90000$; question 6 calculated r-value is $2.098 > 0.90000$; question 7 calculated r-value is $1.245 > 0.90000$, and question 8 calculated r-value is $1.555 > 0.90000$. This rejects the hypothesis that there is a relationship.

The second assessment was on knowledge on cervical cancer between males and females. The results showed that most of the questions (6 out of 11) obtained a calculated r-value below the tabled r-values. Question 10 calculated r-value is $0.932 < 0.98769$; question 12 calculated r-value is $0.576 < 0.98769$; question 13 calculated r-value is $0.285 > 0.98769$; question 16 calculated r-value $0.489 < 0.90000$; question 17 calculated r-value is $0.628 < 0.90000$, and question 19 calculated r-value is $0.403 < 0.90000$. This means the null hypothesis of 'no relationship between knowledge and gender' is accepted. This is supported by males and females being knowledgeable or both answering the same way. In some questions males had the upper hand.

Knowledge about the HPV vaccine was also assessed. The results showed that most of the questions (5 out of 7) obtained a calculated r-value above the tabled r-values. Question 22 calculated r-value is $4.630 > 0.7293$; question 23 calculated r-value is $1.838 > 0.90000$; question 25 calculated r-value is $3.442 > 0.90000$; question 26 calculated r-value is $0.911 > 0.90000$, and question 27 calculated r-value is $3.146 > 0.90000$. The above values reject the hypothesis that males are more knowledgeable than females.

Attitudes towards the HPV vaccine were assessed between the males and females. The results showed that most of the questions (6 out of 11) obtained a calculated r-value below the tabled r-values. Question 5 was not included because it was relevant to females. Question 2 calculated r-value is $0.699 < 0.98769$; question 3 calculated r-value is $0.240 < 0.90000$; question 4 calculated r-value is $0.183 < 0.90000$; question 7 calculated r-value is $0.515 < 0.8054$; question 9 calculated r-value is $0.285 < 0.90000$, and question 10 calculated r-value is $0.684 < 0.90000$. This accepts the hypothesis that there is no relationship between gender and attitude.

Assessment was made on behaviour towards the HPV vaccine between males and females. The results showed that most of the questions (4 out of 5) obtained a calculated r-value higher than the tabled r-values. This rejects the hypothesis that there

is a relationship between behaviour and gender. Question 1 calculated r-value is $1.449 > 0.900$; question 2 calculated r-value is $0.819 > 0.8054$; question 3 calculated r-value is $1.273 > 0.98769$, and question 4 calculated r-value is $3.581 > 0.98769$. Although the statistics reject the hypothesis, the numbers (count) show that males and females answered the same way.

All the wards were assessed on HPV infection, cervical cancer and HPV vaccine. The questions about the dosage intervals for HPV vaccine and the adverse effects of the vaccine were similar in all the wards. They all showed little knowledge on these questions. All the wards displayed little knowledge on the time period for doing Pap smears. The respondents in all the wards displayed positive attitude and behaviour towards HPV vaccine.

5.5 CONCLUSIONS

The study has found a positive relationship between attitude and behaviour and that attitude influences behaviour. Respondents' positive attitude resulted positive behaviour. High awareness of cervical cancer and HPV vaccine had a great impact in the acceptance of HPV vaccine and positive behaviour towards HPV vaccine. This study found that the respondents believed cervical cancer is a serious disease and can cause death, and most of them knew someone who had cervical cancer. Furthermore the respondents believed that their daughters were vulnerable and at risk of contracting HPV infection and cervical cancer, therefore they showed positive behaviour towards the HPV vaccine as a way to prevent cervical cancer. The respondents voluntarily participated in the study and decided to allow their daughters to be vaccinated, thereby showing self-efficacy. Respondents felt confident about taking their daughters for vaccination. Messages or education from health workers and the media about the HPV vaccine led to positive behaviour as well since the majority of the respondents had heard about HPV/HPV vaccine. In this study the respondents' level of education did not seem to be a determining factor in their intention to vaccinate their daughters. Respondents with a lower level of education similarly had positive attitudes and good intentions.

Most of the respondents were females who were aware and the ones affected by cervical cancer. The respondents had a positive attitude and behaviour towards the

HPV vaccine to avoid the threat of HPV and cervical cancer. There were no barriers to getting HPV vaccine since it is provided in primary schools by school health nurses at no cost. Almost all the respondents did not have any cultural or religious beliefs that hindered their daughters from receiving the HPV vaccine.

From the results it can be concluded that the respondents had a medium to high awareness and knowledge about HPV infection, cervical cancer, and the HPV vaccine. HPV vaccine received a high acceptance rate which indicates a positive attitude. Positive behaviour was displayed by the number of girls vaccinated as well as the respondents' willingness to have their daughters vaccinated and complete the three doses.

5.6 CONTRIBUTION OF THE STUDY

The findings from this study will contribute to the body of knowledge on HPV and the HPV vaccine, particularly in Botswana. Parents should be aware and knowledgeable about HPV and the HPV vaccine thereby contributing to reducing the incidence of HPV infections and cervical cancer.

The study should raise awareness of early cervical cancer screening thereby reducing the health bill for the country. The findings should help in identifying areas that need emphasis in preventing cervical cancer by addressing areas that need improvement. This, in turn, should lead to improved effectiveness and implementation of the programme and improved immunisation coverage. Unimmunised girls who are eligible for immunisation will be identified and assisted accordingly.

The study revealed the importance of explaining the dosage and intervals for the HPV vaccination. When parents and communities know the dosages and intervals, they will ensure that their daughters complete the doses and know when they are due for the next vaccination. In addition, parents will then know the likely adverse effects to expect. The study also revealed the importance of knowing the interval for Pap smears. The respondents stated that they found the study informative and educative.

5.7 LIMITATIONS

This study was limited by financial constraints as it was self-sponsored, which affected obtaining the necessary materials and moving around the area, and prevented hiring field workers. In addition, most males were not willing to participate in the study as they believed it was for women since cervical cancer affects females. This resulted in a lower number of male respondents.

5.8 RECOMMENDATIONS

Based on the findings, the researcher makes the following recommendations for practice and further research.

5.8.1 Practice

The study found that many of the respondents did not know the dosage intervals for the HPV vaccine, and the adverse effects of the HPV vaccine. Many respondents also did not know how often Pap smears are done. This indicates a need for healthcare professionals to explain the information clearly. Health workers need to work hard in educating the community about the HPV, the HPV vaccine, cervical cancer and the Pap smear. Health talks/education should be emphasised so that parents can make informed decisions.

5.8.2 Further research

Further research should be conducted on the following topics:

- An assessment of the uptake of the HPV vaccine and implementation of the prevention strategy.
- The progression of HPV infection to cervical lesion or clearance.
- Adolescents' awareness, knowledge and perceptions of HPV and the HPV vaccine in urban and rural areas of Botswana.

5.9 CONCLUDING REMARKS

Botswana has a high incidence of HPV infections and cervical cancer. The high prevalence of HPV contributes to increased morbidity and mortality of cervical cancer. The magnitude of cervical cancer in Botswana was of grave concern to the researcher. The HPV vaccine was licensed in Botswana in 2009, and is now given free to adolescent girls aged 9 to 13 years as a preventive strategy against HPV. Parents' decision to vaccinate their daughters plays a crucial role in the successful implementation of the prevention programme. The public health benefit of the prophylactic vaccination can be achieved if parents have knowledge and positive attitudes towards the HPV vaccine.

The study was a journey of discovery for the researcher who was encouraged by the respondents' willingness and sharing.

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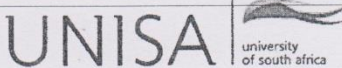
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ANNEXURES

ANNEXURE A

Ethical Clearance from the Research Ethics Committee: Department of Health Studies, Unisa


UNISA | university of south africa

RESEARCH ETHICS COMMITTEE: DEPARTMENT OF HEALTH STUDIES
REC-012714-039 (NHERC)

27 March 2017

Dear Mrs KT Senatla

Decision: Ethics Approval

HS HDC/679/2017
Mrs KT Senatla
Student: 4466-492-3
Supervisor: Prof BL Dolamo
Qualification: D Cur
Joint Supervisor: -

Name: Mrs KT Senatla

Proposal: Knowledge, attitudes and behaviour towards human papillomavirus (HPV) and HPV vaccine among parents with adolescent girls 9-13 years in Sefhare, Botswana.


Qualification: MPCHS94

Thank you for the application for research ethics approval from the Research Ethics Committee: Department of Health Studies, for the above mentioned research. Final approval is granted for the duration of the research period as indicated in your application.

The application was reviewed in compliance with the Unisa Policy on Research Ethics by the Research Ethics Committee: Department of Health Studies on 27 March 2017.

The proposed research may now commence with the proviso that:

- 1) The researcher/s will ensure that the research project adheres to the values and principles expressed in the UNISA Policy on Research Ethics.*
- 2) Any adverse circumstance arising in the undertaking of the research project that is relevant to the ethicality of the study, as well as changes in the methodology, should be communicated in writing to the Research Ethics Review Committee. Department of Health Studies. An amended application could be requested if there are substantial changes from the existing proposal, especially if those changes affect any of the study-related risks for the research participants.*


Open Rubric

University of South Africa
Preller Street, Muckleneuk Ridge, City of Tshwane
PO Box 392 UNISA 0003 South Africa
Telephone: +27 12 429 3111 Facsimile: +27 12 429 4150
www.unisa.ac.za

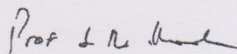
3) The researcher will ensure that the research project adheres to any applicable national legislation, professional codes of conduct, institutional guidelines and scientific standards relevant to the specific field of study.

4) [Stipulate any reporting requirements if applicable].

Note:

The reference numbers [top middle and right corner of this communiqué] should be clearly indicated on all forms of communication [e.g. Webmail, E-mail messages, letters] with the intended research participants, as well as with the Research Ethics Committee: Department of Health Studies.

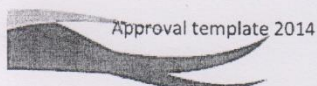
Kind regards,



Prof L Roets
CHAIRPERSON
roetsl@unisa.ac.za



Prof MM Moleki
ACADEMIC CHAIRPERSON
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ANNEXURE B

Letter seeking permission to do research

Institute of Health Sciences

P.O Box 601487

Gaborone

6th April 2017

The Director

Health Policy Development, Monitoring & Evaluation

Ministry of Health

Private Bag 0038

Gaborone

u.f.s: Principal Institute of Health Sciences Gaborone

Dear sir/madam

OSitbareb
07/04/17

Re: Permission to do research on knowledge, attitudes and behaviour towards HPV and HPV vaccine among parents with adolescents girls 9 to 13 years.

This letter serves as request for permission to carry the above mentioned study. The study will take place in Sefhare in the Central District.

The aim of the study is to determine or asses knowledge, attitudes and behaviour towards HPV and HPV vaccinein preventing cervical cancer in girls 9 to 13 years. This study would add to the body of knowledge or literature on HPV and HPV vaccine matters in the country.

The results of the study will help identify knowledge gaps, identify the girls that are not vaccinated but eligible to be vaccinated. It will also help in evaluating the implementation of prevention strategy and hence improve service delivery.

Please find attached, letter of permission to study Master of Public Health, proof of registration for the Dissertation for academic year 2017 and Ethical clearance Certificate from UNISA.

Thanking you in advance for your cooperation.


Yours faithfully

Senatla

Kgola Senatla

ANNEXURE C

Letter of research approval

PRIVATE BAG 0038 GABORONE BOTSWANA REFERENCE:	 <small>REPUBLIC OF BOTSWANA</small> MINISTRY OF HEALTH AND WELLNESS	TEL: (+267) 363 2500 FAX: (+267) 391 0647 TELEGRAMS: RABONGAKA TELEX: 2818 CARE BD
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REFERENCE NO: HPDME 13/18/1 XI	24 May 2017
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Health Research and Development Division

Notification of IRB Review: **New application**

KgolaSenatla
P.O. Box 985
Gaborone
Botswana

Dear KgolaSenatla

Protocol Title: **KNOWLEDGE, ATTITUDES AND BEHAVIOR TOWARDS
HUMAN PAPILLOMA VIRUS (HPV) AND HPV VACCINE
AMONG PARENTS WITH ADOLESCENT GIRLS 9-13 IN
SEFHARE, BOTSWANA**


HRU Approval Date:	24 May 2017
HRU Expiration Date:	23 May 2018
HRU Review Type:	Expedited Review
HRU Review Determination:	Approved
Risk Determination:	Minimal risk

Thank you for submitting new application for the above referenced protocol. The permission is granted to conduct the study.

This permit does not however give you authority to collect data from the selected sites without prior approval from the management. Consent from the identified individuals should be obtained at all times.

The research should be conducted as outlined in the approved proposal. Any changes to the approved proposal must be submitted to the Health Research and Development Division in the Ministry of Health for consideration and approval.

Furthermore, you are requested to submit at least one hardcopy and an electronic copy of the report to the Health Research, Ministry of Health and Wellness within 3 months of completion of the study. Approval is for academic fulfillment only. Copies should also be submitted to all other relevant authorities.

Vision: <i>A Healthy Nation by 2036.</i> Values: <i>Botho, Equity, Wellness, Customer Focus, Teamwork, Accountability</i>	 BOTSWANA <small>For growth, good governance</small>
--	--

Continuing Review

In order to continue work on this study (including data analysis) beyond the expiry date, submit a Continuing Review Form for Approval at least three (3) months prior to the protocol's expiration date. The Continuing Review Form can be obtained from the Health Research Division Office (HRDD), Office No. 7A.7 or Ministry of Health website: www.moh.gov.bw or can be requested via e-mail from Mr. KgomoMothanka, e-mail address: kgmmothanka@gov.bw. As a courtesy, the HRDD will send you a reminder email about eight (8) weeks before the lapse date, but failure to receive it does not affect your responsibility to submit a timely Continuing Report form.

Amendments

During the approval period, if you propose any change to the protocol such as its funding source, recruiting materials, or consent documents, you must seek HRDC approval before implementing it. Please summarize the proposed change and the rationale for it in the amendment form available from the Health Research Division Office (HRDD), Office No. 7A.7 or Ministry of Health website: www.moh.gov.bw or can be requested via e-mail from Mr. KgomoMothanka, e-mail address: kgmmothanka@gov.bw. In addition submit three copies of an updated version of your original protocol application showing all proposed changes in bold or "track changes".

Reporting

Other events which must be reported promptly in writing to the HRDC include:

- Suspension or termination of the protocol by you or the grantor
- Unexpected problems involving risk to subjects or others
- Adverse events, including unanticipated or anticipated but severe physical harm to subjects.

If you have any questions please do not hesitate to contact Mr KgomoMothanka at kgmmothanka@gov.bw at 3632751. Thank you for your cooperation and your commitment to the protection of human subjects in research.

Yours faithfully

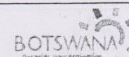


Dr K. Seipone
for **PERMANENT SECRETARY**



Vision: A Healthy Nation by 2036.

Values: Botho, Equity, Excellence, Customer Focus, Teamwork, Accountability



ANNEXURE D

Questionnaire

Knowledge, attitudes and behaviour towards HPV and HPV vaccine among parents with adolescent 9-13 years girls in Sefhare, Botswana.

Section 1: Demographic data

Ward:

Age of child:

<i>Question No</i>	<i>Question</i>	<i>Response</i>	<i>Code</i>
1	Gender	1. Male 2. Female	
2	Age	1. 25-29 years 2. 30-34 years 3. 35-39 years 4. 40-44 years 5. 45 and above	
3	Level of Education	1. Never been to school 2. Primary 3. Secondary 4. Tertiary	
4	Occupation	1. Unemployed 2. Self employed 3. Employed	
5	Marital Status	1. Single 2. Married 3. Divorced 4. Widowed	

Section 2: Knowledge Questions

Question No	Knowledge about HPV infection	Response	Code
1	Have you ever heard about HPV infection?	1. Yes 2. No	
2	I heard about HPV infection from	1. Friend 2. Health worker 3. Media 4. Other (Specify).....	
3	Can HPV infection be transmitted through sex?	1. Yes 2. No 3. No idea	
4	Does HPV infection cause cervical cancer?	1. Yes 2. No 3. No idea	
5	Does using a condom partially protect one from contracting HPV infection?	1. Yes 2. No 3. No idea	
6	Anyone who has had sex could contract HPV infection?	1. Yes 2. No 3. No idea	
7	Can HPV infection be prevented?	1. Yes 2. No 3. No idea	
8	Do multiple sex partners increase the risk acquiring HPV infection?	1. Yes 2. No 3. No idea	

9	<i>Knowledge about cervical cancer</i>		
10	Have you ever heard about cervical cancer?	1. Yes 2. No	
11	I heard about cervical from	1. Friend 2. Health worker 3. Media 4. Other (Specify).....	
12	Is cervical cancer a serious disease?	1. Yes 2. No 3. No idea	
13	Cervical cancer can cause death	1. Yes 2. No 3. No idea	
14	Cervical cancer is caused by HPV	1. Yes 2. No 3. No idea	
15	Cervical cancer can be prevented	1. Yes 2. No 3. No idea	
16	Pap smear is used to detect cervical cancer	1. Yes 2. No 3. No idea	
17	Pap smear is done every 2-3 years	1. Yes 2. No 3. No idea	
18	Cervical cancer be treated if diagnosed early	1. Yes 2. No 3. No idea	
19	Can cervical cancer affect the relationship between the husband and partner	1. Yes 2. No 3. No idea	
20	Do you know anyone that has/had cervical cancer?	1. Yes 2. No	

	<i>Knowledge about HPV vaccine</i>		
21	Have you heard about HPV vaccine?	1. Yes 2. No	
22	I heard about HPV vaccine from	1. Friend 2. Health worker 3. Media 4. Other (Specify).....	
23	HPV vaccine is used to prevent cervical cancer	1. Yes 2. No 3. No idea/ N/A	
24	Do you know the dosage intervals of the vaccine?	1. Yes 2. No 3. N/A	
25	Have you been told about the benefits of a girl being vaccinated?	1. Yes 2. No 3. N/A	
26	Have the adverse effects been explained to you?	1. Yes 2. No 3 N/A	
27	Do you know that the government offers HPV vaccine for free?	1. Yes 2. No 3. N/A	

Section 3: Attitude Questions

Question No	Questions	Response	Code
1	I am able to make decisions that affect my household	1. Strongly disagree 2. Disagree 3. Agree 4. Strongly Agree	
2	I feel confident taking my daughter for HPV vaccination	1. Strongly disagree 2. Disagree 3. Agree 4. Strongly Agree	
3	There are health benefits for getting HPV vaccine	1. Strongly disagree 2. Disagree 3. Agree 4. Strongly Agree	
4	HPV vaccine is effective in preventing cervical cancer	1. Strongly disagree 2. Disagree 3. Agree 4. Strongly Agree	
5	I have no problem telling my child if I have cervical cancer	1. Strongly disagree 2. Disagree 3. Agree 4. Strongly Agree	
6	HPV vaccine prevents HPV and STIs	1. Strongly disagree 2. Disagree 3. Agree 4. Strongly Agree	
7	HPV vaccine can cause infertility	1. Strongly disagree 2. Disagree 3. Agree 4. Strongly Agree	

8	It is best to administer HPV vaccine before sexual initiation	1. Strongly disagree 2. Disagree 3. Agree 4. Strongly Agree	
9	The girl should get 3 doses of HPV vaccine	1. Strongly disagree 2. Disagree 3. Agree 4. Strongly Agree	
10	It is important to complete all the 3 doses	1. Strongly disagree 2. Disagree 3. Agree 4. Strongly Agree	
11	HPV vaccine information was clearly explained	1. Strongly disagree 2. Disagree 3. Agree 4. Strongly Agree	
12	HPV vaccine information was clearly publicised	1. Strongly disagree 2. Disagree 3. Agree 4. Strongly Agree	

Section 4: Behaviour

Question No	Question	Response	Code
1	Is your child immunised or vaccinated or vaccination?	1. Yes 2. No	
2	Did she complete all her dosages?	1.Yes 2.No 3.N/A	
3	Do you have plans to immunise your child?	1. Yes 2. No 3. N/A	
4	Would you encourage other parents to take their daughters for vaccination?	1. Yes 2. No	
5	Are there any girls that you know that are not immunised but are of age?	1. Yes 2. No	

ANNEXURE E

Consent form

Good morning/afternoon sir/madam. My name is Kgola Senatla, a Master of Public Health student at the University of South Africa. As an academic requirement, I am doing research on the topic: **Knowledge, attitudes and behaviour among parents with adolescent girls (ages 9-13) towards HPV and HPV vaccine.** The purpose of the study is to determine or asses level of knowledge, attitudes and behaviour of parents towards HPV and HPV vaccine in preventing cervical cancer and HPV vaccine uptake.

I have been given the permission to carry this study by the Ministry of Health and UNISA Higher Degrees Committee.

Your name is not going to be written down, the information that you give me will not be associated with you anyhow. The information taken from you is going to be known to me and is not going to be shared with anyone or published. You are free at any time of the study to stop me and ask questions, and you are free to quit the study anytime you feel and there is no judgment against you.

Although your participation in the study will help me with my studies, there are benefits to the community as well. This includes identifying knowledge gaps and those areas that need improvement, assess immunization access and coverage and evaluate the prevention and implementation strategy. The girls who did not get the vaccine but qualify to be given would be identified and helped accordingly.

You are not compelled to take part in this research.

If you agree to take part in this study, I am going to ask you a couple of questions. Do you want to participate?

Signature of the respondent: Date:

Researcher's signature Date:

ANNEXURE F

Letter from the editor

53 Glover Avenue
Doringkloof
0157 Centurion

16 November 2017

TO WHOM IT MAY CONCERN

I hereby certify that I have edited Kgola Tebogo Senatla's Master's dissertation, **Knowledge, attitudes and behaviour towards human papilloma virus (HPV) and HPV vaccine among parents with adolescent girls 9 to 13 years in Sefhare, Botswana**, for language and content.

IM Cooper

Iauma M Cooper
192-290-4

Mobile: 073 782 3923